EURO XX

20TH EUROPEAN CONFERENCE ON OPERATIONAL RESEARCH
OR and THE MANAGEMENT of ELECTRONIC SERVICES

July, 4-7 2004

Rhodes - Greece

ABSTRACT BOOK

Contents

Message from EURO President

It is a pleasure to welcome you to EURO XX, the 20th European Conference On Operational Research, whose timely theme is OR and the Management of Electronic Services. I wish you a pleasant stay enjoying both Rhodes as a wonderful historic city from the ancient Greece and the scientific sessions of our conference.

I would like to use this opportunity to mention one of the main efforts of the EURO executive committee for improving the image of Operational Research in Europe as a problem solving scientific discipline and profession. Our concern is also shared by our member societies, by IFORS, INFORMS and others. For this purpose, EURO has established a taskforce (Valerie Belton, Rainer Burkard, Eric Jacquet-Legrèze, Martine Labbé, Jo van Nunen, Roman Slowinski, Paolo Toth, Luk van Wassenhove and Dominique de Werra) coordinated by Alexis Tsoukiàs, President Elect of EURO. We have created the site http://www.euro-online.org/display.php?page=branding_or, where you can see the relevant information coming from the works of the taskforce, and the site http://www.euro-online.org/display.php?page=tell_us, where we would like to collect your short stories related to your experience on dealing with OR (successful stories, reasons for the unsuccessful ones, etc.). We invite all attendees to the conference and the members of the European OR Societies to join us in this initiative to brand Operational Research in Europe.

In January 2005 EURO will be 30 years old. A history of challenges and of success. Established in January 1975 in Brussels by 11 European societies, EURO today represents 29 national societies and more than 10000 practitioners and academics all around Europe. While we remain proud for the achievements of these 30 years we are aware of the new challenges we are facing within the process of European unification (European training standards, European research funding, European job market, etc.). Such challenges will require the efforts of all of us. We are sure our community will not miss this opportunity and will be able to add one more success in our history.

Again, I wish all of you a pleasant stay in Rhodes and a useful meeting.

Laureano F. Escudero

Message from the Organizing Committee Chair

On behalf of the Organizing Committee and the Hellenic Operational Research Society (HELORS), let me welcome you to the EURO XX Conference in Rhodes during July 4-7, 2004.

The Island of Rhodes, the largest of the Dodecanese complex, is also known as the isle of Sun. The famous poet Pindaros mentions in one of his Odes that it was born of the union of Helios, the sun god, and the nymph Rhoda. The capital of this island, also called Rhodes, is actually three cities on one site - modern, ancient and mediaeval. Its history come back in 700B.C. and along the centuries has been gifted with a lot of monuments and sites worthy to see.

The fact that the 20th Conference of EURO has chosen as main topic "OR and the management of electronic services", a modern and very important topic for all researchers and interested companies, will represent an additional reason for you to join us on the beautiful Island of Rhodes. The total number of articles exceeds 600 and will be presented in semi-plenary, discussion presentations (posters) and in parallel sessions.

We hope you will have the unique opportunity to enjoy your stay in Rhodes, both from the scientific and cultural point of view.

Professor Yannis Siskos
President of HELORS

Message from the Programme Committee Chair

Welcome to the beautiful Island of Rhodes and the comfortable Conference Venue. We hope that you will all have a productive and enjoyable conference.

"Or and the Management of Electronic Services" has proven a stimulating conference theme. More than 600 papers (organized, contributed and discussion presentations) will be presented in 17 streams of parallel sessions, along with three plenary and 16 semi-plenary lectures. These presentations will deliver an up-to-date state of the art of European OR and more particularly of the contribution of OR to the development of the internet and electronic services.

Our sincere thanks go to all those who supported us so efficiently in setting up this Conference programme. We are most grateful to the members of the Programme Committee who managed to attract so many researchers and practitioners to participate in the Conference. Our thanks go also to the Organizing Committee. We are indebted to them for their kind support and co-operation.

Luxembourg, June 2004

Raymond Bisdorff
PC Chair

committees

organiser

Hellenic Operational Research Society (HELORS): eeee@otenet.gr

programme committee

Chair: Raymond Bisdorff (L), raymond.bisdorff@univ.lu
Gülay D. Barbarosoglu, EURO Vice-President I, barbaros@boun.edu.tr
Jacek Blazewicz (Pl), blazewic@put.poznan.pl
Federico Della Croce (I), federico.dellacroce@polito.it
Janos Fodor (H), jfodor@univet.hu
Valery S.Gordon (By), gordon@newman.bas-net.by
Frank Plastria (B), Frank.Plastria@vub.ac.be
Marc Sevaux (F), Marc.Sevaux@univ-valenciennes.fr
Yannis Siskos (Gr), chair of Organizing Committee, ysiskos@unipi.gr
Gerhard Wascher (D), Chair of EURO'2003, waescher@ww.uni-magdeburg.de

organising committee

Chair: Yannis Siskos, University of Pireaus, Greece, ysiskos@unipi.gr
Gülay D. Barbarosoglu, Bogaziçi University, Turkey, barbaros@boun.edu.tr
Raymond Bisdorff, University of Luxembourg, Luxembourg, bisdorff@cu.lu
John Darzentas, University of the Aegean (Syros), Greece, idarz@aegean.gr
Danae Diakoulaki, National Technical University of Athens, Greece, diak@chemeng.ntua.gr
Augoustinos Dimitras, Athens Univ. of Economics and Business, Greece, dimitras@aueb.gr
Georgios I.Doukidis, Athens University of Economics and Business, Greece, gjd@aueb.gr
Fragiskos Kalavasis, University of the Aegean (Rhodes), Greece, kalabas@rhodes.aegean.gr
Nikolaos Matsatsinis,Technical University of Crete, Greece, nikos@ergasya.tuc.gr
Ioannis Minis, University of the Aegean (Chios), Greece, i.minis@fme.aegean.gr
Chrysoleon Papadopoulos, University of the Aegean (Chios), Greece, hpap@aegean.gr
Evangelos Sambracos, University of Pireaus, Greece, sambra@unipi.gr
Zilla Sinuany-Stern, Ben-Gurion University, Israel, zilla@bgumail.bgu.ac.il
Athanasios Spyridakos, Technological Institute of Pireaus, Greece, tspyr@teipir.gr
Christos Tarantilis, Athens University of Economics and Business, Greece, tarantil@aueb.gr
Kostas Tsolakidis, University of the Aegean (Rhodes), Greece, tsolak@aegean.gr
Constantin Tsouros, Aristotle University of Thessaloniki, Greece, tsouros@gen.auth.gr
Michael Varelas, ERGOSE S.A., Greece, mivarelas@ergose.gr
Denis Yannacopoulos, Technological Institute of Pireaus, Greece, digian@01p.gr
Constantin Zopounidis, Technical Univ. of Crete, Greece, kostas@dias.ergasya.tuc.gr

general information

Conference Theme

"OR AND THE MANAGEMENT OF ELECTRONIC SERVICES"

One of the most important concerns of the European Union is the ensuring and continuous improvement of goods and services within the Europe of today and tomorrow. Among the technologies used for this purpose, the Internet has become a powerful vehicle of services rather than just a repository of information. Many organizations are struggling to put their core business competences on the Internet as a collection of e-services while customers could retrieve these services from the web and fuse them into combinations of new value-adding e-services in different ways.

The theme of the conference deals with the contribution of operational research philosophies, methods and techniques to the design, performance and delivery of e-services. Papers submitted to the conference are targeted towards those engaged in the academic and practical aspects of e-Commerce, e-Business and e-Government.

Information for speakers and session chairs

Guidelines for speakers in organized or contributed sessions

The room and location of your session are listed in the Parallel Sessions section. Please be on time for your session and check in with the session chair 15 minutes before your session starts.

The total time allocated to each speaker in a parallel session is 22 minutes. Time your presentation to fit within your designed time span and leave an opportunity for questions and audience participation.

No proceedings with complete papers will be produced. To obtain copies of complete papers of any abstracts in the programme, please contact the authors directly at the addresses supplied in the participants list.

Guidelines for poster and discussion presentations

The EURO XX Conference innovates with the new category of discussion presentations, a type of presentations organized in the style of the prestigious natural science conferences.

A discussion presentation is in between a traditional lecture of 20 minutes in a contributed or organized session and a simple poster without any oral presentation.

All participants accepted in this category were kindly requested to elaborate a poster of approximative size Din A0 to be exhibited for one day in the lobby of the JUPITER room. Posters are supposed to be set up between 8h30 and 9h00 the day the discussion presentation is scheduled. It has to be removed the same day between 17h30 and 18h00. Time slot and panel number of your discussion presentation are listed in the Parallel Sessions section below.

Discussion presentations are scheduled in slots of 30 minutes during the

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normal parallel sessions, in front of your panel. They give you the possibility to present your work, with the poster illustration in the background, in a more or less formal way (this is up to you) for say about 15 minutes and answer questions from the audience for the rest of the time. It will be helpful to prepare hands-outs for the audience.
To encourage this new type of submission the Conference organizer offers the EURO Best Poster Award. This award will be granted during the Closing session and consists of a diploma and a prize of 1000 Euros.

Guidelines for Sessions Chairs
The role of the session chair is to coordinate the smooth running of the session. The Chair:
- begins and ends each session on time. Each session lasts 90 minutes and the time per presentation is 22 minutes. Equal time should be given to each speaker;
- introduces each presentation (just the title and the name of the presenting author). Lets speakers know when time is running short;
- ensures that presentations are made in the order shown in the programme.

The session chair will in principle be the first scheduled speaker in the session. In its absence it is the next scheduled speaker and so on.
In case of absence of a speaker, the remaining presentations (applicable also to the organized sessions) are shifted forward in time.

Audio/Visual Equipment
Every room is equipped with a data projector and an overhead projector. Please follow these guidelines to ensure a successful presentation using the data projector:
- bring your laptop PC to your session. No computers or laptops will be supplied in the rooms;
- arrive at your session at least 15 minutes before it begins in order to test the connection to the data projector before the session begins;
- produce and bring overhead transparencies as a safety solution.

Quick instructions and technical assistance with audio-visual equipment will be provided at each session room.

European Journal of Operational Research (EJOR) Special Issue

A special issue of EJOR will be published in 2005. The theme of the special issue is "OR and the Management of Electronic Services". Conference participants who are interested in having their paper published in this special issue should submit four (hard) copies to

Prof. Raymond Bisdorff
University of Luxembourg

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Faculty of Law, Economics and Finance
162a, avenue de la Faïencerie
L-1511 LUXEMBOURG

no later than September 30, 2004. Papers are particularly invited which relate OR applications concerning the management of electronic and internet services. Papers should be prepared according to the Instructions for Authors which can be found at the end of each volume of EJOR. All papers will be refereed according to EJOR standards.

Registration & Conference information desk

Registration will take place in Rodos Palace Hotel at the Conference Information Desk which will also provide information about all aspects of the conference. It will be open during the following hours

Sunday	July 4	16:00 - 19:00
Monday	July 5	08:00 - 17:00
Tuesday	July 6	08:00 - 17:00
Wednesday	July 7	08:00 - 17:00

* The information desk will be closed during lunch time.Registration hours:

Internet Corner

At Jupiter Foyer, and Atrium Lobby, will be operated Internet connection during the Conference dates.

Highlights

Sunday, July 4: Welcome Reception, Rodos Palace Hotel (20:00)
Monday, July 5: Reception by the Mayor of Rhodes, Old Town (20:30)
Pickup time from Rodos Palace Hotel at 20:00
Tuesday, July 6: Banquet (Greek Night), Rodos Palace Hotel (20:30)

Exhibit Hall

Located in the Rodos Palace Hotel, it will be open during the following hours:

Monday	July 5	09:00 – 17:30
Tuesday	July 6	09:00 – 17:30
Wednesday	July 7	09:00 – 17:30

List of Exhibitors

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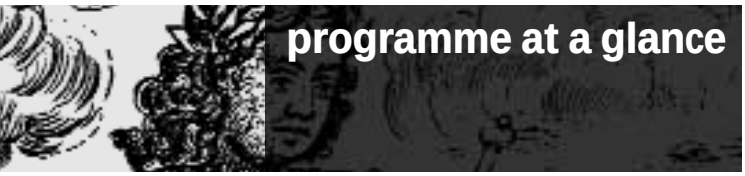


programme at a glance

EURO XX Conference Structure				
Slots	**Monday** July 5	Slots	**Tuesday** July 6	**Wednesday** July 7
9:00 - 10h:30	parallel sessions, MA	9:00 - 10h:30	parallel sessions, TA	parallel sessions, WA
10:30 - 10h:45	coffee break	10:30 - 11h:00	coffee break	coffee break
10:45 - 12:30	Opening session, MB	11:00 - 12:30	Semi-plenary Sessions, TB	Semi-plenary Sessions, WB
12:30 - 14:00	lunch break	12:30 - 14:00	lunch break	lunch break
14:00 - 15:30	parallel sessions MC	14:00 - 15:30	parallel sessions TC	parallel sessions WC
15:30 - 16:00	coffee break		coffee break	coffee break
16:00 - 17:30	parallel sessions MD	16:00 - 17:30	parallel sessions TD	Closing session WD

Opening session MB01
Jupiter Room 10:45 – 12:30

***Chair**: Prof. Yannis Siskos, University of Piraeus*
Welcome:
Yiannis Siskos,
Organizing Committee Chair
Laureano Escudero,
President of EURO

Introductory plenary lecture
Georgios Doukidis

2004 EURO Gold Medal
Dominique de Werra, President of the 2004 EURO Gold Medal jury
EURO Gold Medalist lecture

Closing session WD01
Jupiter Room 16:00 – 17:30

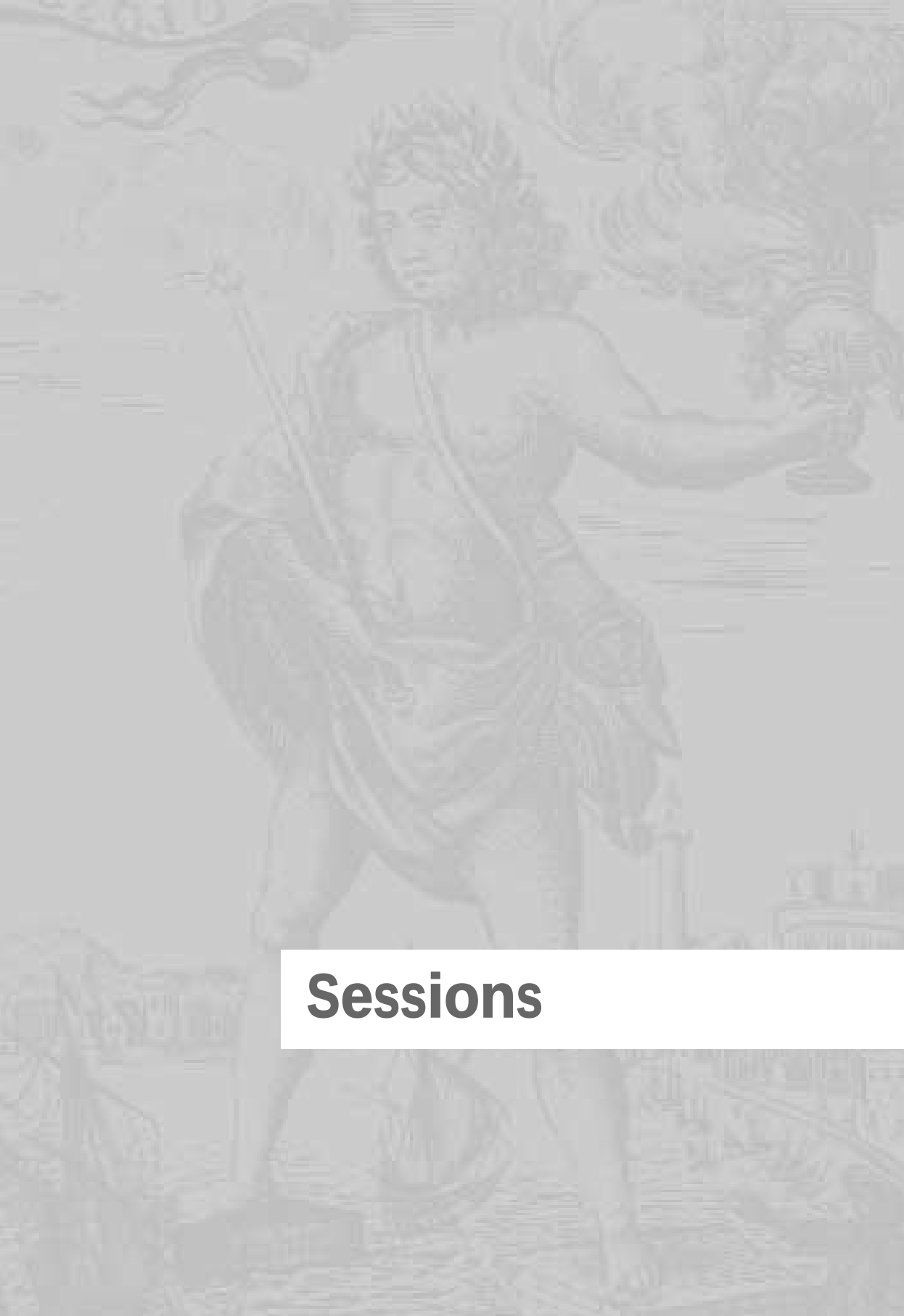
***Chair**: Prof. Yannis Siskos, University of Piraeus*
IFORS Distinguished Lecture
Prof. Michael Pinedo, MIT

Best Poster Award (Prof. Raymond Bisdorff)

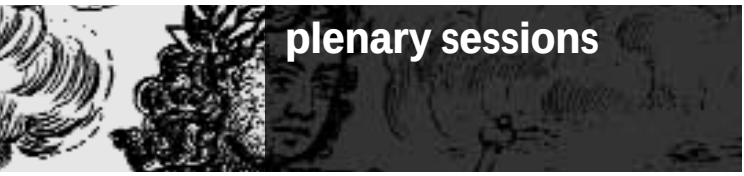
EDDA Award (Prof. Jean-Pierre Brans)
Conclusions

Future EURO related Conferences

Closing addresses



Sessions



Opening Plenary

Monday, July 5

MB01, 10:45 – 12:30, Jupiter Room **Opening Session**

Prof. Georgios DOUKIDIS
Athens University of Economics and Business Department of Management Science and Technology, Email: gjd@aueb.gr

"Supply Chains of the Future and Ubiquitous Consumer Electronic Services"

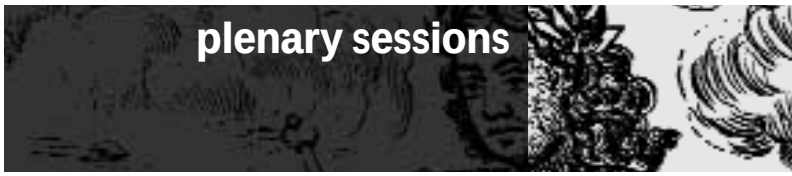
This presentation focuses on the supply-chain opportunities provided by emerging wireless and mobile commerce technologies coupled with automatic product identification technologies (RFID). Speed and visibility have become supply chain imperatives and it is foreseen that the above technologies will transform the supply chain, delivering multiple benefits, such as improved on-self availability, reduced losses and theft, better inventory, warehouse and back-room and self management. The presentation will focus on the downstream consumer-driven part of the supply-chain by analyzing potential in-store and at post-purchase level services, such as: returns and claims management, after sales service, product recall, intelligent and personalized store and home applications. Examples will be given from the consumer goods industry.

SHORT BIO

Georgios I. Doukidis is a Professor in Information Systems and Chairman of the Department of Management Science and Technology at the Athens University of Economics and Business (AUEB). He holds and MSc in Operational Research and a PhD in Simulation/Artificial Intelligence from the London School of Economics, where he taught as a lecturer for six years. Since 1995 he has also been a visiting Professor at Brunel University in UK. He has published 12 books (including "Knowledge Based Management Support Systems", "Artificial Intelligence in Operational Research" and "Decision Making: Recent Development and Worldwide Applications") and more than 120 scientific papers and has been acted as guest editor for the *Journal of Operational Research Society*, the *European Journal of Information Systems*, the *Journal of Information Technology* and the *International Journal of Electronic Commerce*. Presently, he is member of the Editorial Board in the following journals: *Journal of Strategic Information Systems, Electronic Markets, International Journal of Information Systems and eBusiness Management, Business Process Management Journal, Journal of Decision Sciences, ECR Journal: International Commerce Review*.

He is founder and director of the E-Business Research Center of AUEB (called ELTRUN), which is the largest in the field in European Business Schools and specializes on knowledge management and e-learning, new business models, socio-economic and organizational impact of the digital economy, interactive media design, digital marketing and electronic retailing. The Center with its 35 researchers, collaborates closely with more than 40 R&D groups of international companies, such as: Nokia, Oracle, Unisys,, Microsoft, Vodafone, Sonera, Siemens, etc, and leading research groups in Europe and N. America. He is founder/member of the executive board of GeM (Global eManagement MBA), which runs with leading Business Schools in Europe and America. He is also member of the Academic Board of ECR-Europe.

In his 22 years of academic career, he has presented various scientific papers in more than 120 International and National Conferences in 22 different countries and acted as Chairman in the following International Conferences: European Conference in Information



Systems (1995), International Electronic Commerce Conference (1998), International Conference of the Decision Sciences Institute (1999), International Conference on Mobile Business (2002). His latest book on "Social and Economic Transformation in the Digital Era" was published by IDEA in October 2003.

EURO Gold Medal Plenary

Monday, July 5

MB01, 10:45 – 12:30, Jupiter Room **Opening Session**

Moderator: Dominique de Werra
Ecole Polytechnique Fédérale de Lausanne

The EURO Gold Medal is the highest distinction within OR in Europe. It is conferred to a prominent person or institution, for an outstanding contribution to the Operational Research science.

The Award, which officially is bestowed in conjunction with a EURO Conference, is not only a significant honour for the Laureate personally, but also important for the general promotion of OR as leading scholars and their contributions are made better known via the Medal. Laureates of the EURO Gold Medal are invited to all future EURO Conferences without payment of the registration fees.

Nominations of candidates are solicited from the national societies in the year prior to each EURO Conference. To emphasize the European flavour of the Award, all societies are strongly urged not to propose a candidate from their own country. Moreover, no currently active officer of EURO (Executive Committee Member, EURO Gold Medal jury member, Organising and Programme Committees Chairmen of the conference where the EURO Gold Medal will be awarded) is eligible. The societies are responsible for providing a recent and detailed CV of their nominee, as well as a written motivation stating the reasons why their nominee deserves the EURO Gold Medal.

The jury evaluates the proposed candidates essentially on basis of their scientific activities (papers in excellent journals, editorials, jobs, number of PH.D. students...). The proposed laureate should also have contributed to the promotion of OR, in particular in Europe.

IFORS distinguished lecture

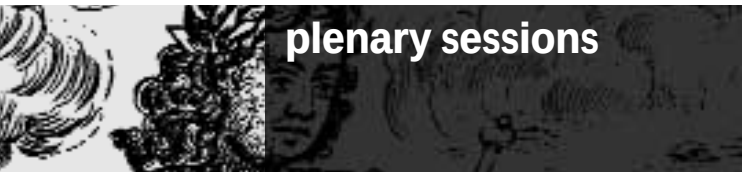
Wednesday, July 7

WD01, 16:00 – 17:30, Jupiter Room **Closing Session**

Prof. Michael PINEDO
Stern School of Business, New York University, Email: mpinedo@stern.nyu.edu

"Planning and Scheduling in the Service Industries"

This lecture focuses on planning and scheduling in the service industries. The planning and scheduling models in services and the solution methodologies used tend to be different from those applied in manufacturing environments. This talk goes into four



classes of models. The first class includes interval scheduling models and reservation systems. The second class involves timetabling and tournament scheduling. The third class consists of transportation models (tanker scheduling, aircraft routing and scheduling and train timetabling). The fourth and last class are the workforce scheduling models. We conclude with a summary of the similarities and the differences between the model formulations and solution techniques used in the various different classes of models.

SHORT BIO

Michael Pinedo received the Ir. degree in mechanical engineering from the Delft University of Technology, the Netherlands in 1973 and the M.Sc. and Ph.D. degrees in Operations Research from the University of California at Berkeley in 1978.

He is the Julius Schlesinger Professor of Operations Management and Deputy Chair of the department of Information, Operations and Management Sciences at the Stern School of Business at New York University. From 1982 to 1997 he taught in the industrial engineering and operations research department at Columbia University. He taught at the Instituto Venezolano de Investigaciones Cientificas (Caracas) from 1978 to 1980 and at the Georgia Institute of Technology from 1980 to 1982.

His research focuses on the modeling of production and service systems, and, more specifically, on the planning and scheduling of these systems.

He has written or jointly written numerous technical papers on these topics. He is author of the text ``*Scheduling: Theory, Algorithms and Systems*" (with Prentice-Hall), coauthor of a book on ``*Operations Scheduling with Applications in Manufacturing and Services*" (with McGraw-Hill/Irwin), coauthor of ``*Queueing Networks: Customers, Signals and Product Form Solutions*" (with Wiley), and co-editor of ``*Creating Value in Financial Services: Strategies, Operations, and Technologies*" (with Kluwer).

He is Editor of the *Journal of Scheduling* (Wiley), associate editor of *Management Science*, *Naval Research Logistics*, and *Interfaces*, and senior editor of *Manufacturing and Services Operations Management*.

Tuesday, July 6

TB03-1, 11:00 - 11:45 **Athena**

Chair: Federico Della Croce

Prof. Alberto CAPRARA
DEIS, University of Bologna, Viale Risorgimento, 2, 40136 Bologna, Italy,
e-mail: acaprara@deis.unibo.it

"Constrained 0/1 quadratic programming: basic approaches and extensions"

We describe the simplest technique to tackle 0-1 Quadratic Programs among those that turn out to be successful in practice. This method is due to and familiar to the Quadratic Assignment experts, even if it took some time to realize that most approaches to the problem could be interpreted in these terms, where as it does not appear to be known outside this community. Since the technique is completely general and is by far the most successful one in several other cases, such as Quadratic Knapsack, we illustrate it in its full generality, pointing out its relationship to Lagrangian and linear programming relaxations and discussing further extensions. We believe that this method should be in the background of every practitioner in Combinatorial Optimization.

Tuesday, July 6

TB03-2, 11:45 – 12:30 **Athena**

Chair: Federico Della Croce

Prof. Alexander RUBINOV
Professor of Mathematics, School of Information Technology and Mathematical Sciences (SITMS), Director Centre for Informatics and Applied Optimization (CIAO), University of Ballarat, P.O. Box 663 Ballarat, Victoria 3353 Australia,
email: a.rubinov @ ballarat.edu.au

"Multidimensional descent methods for global optimization"

Numerical methods for global optimization are very time consuming and could not be applied for high-dimensional non-convex optimization problems. This is the reason why many researches use various combinations of global and local techniques. The following two types of combinations are popular:

1) A local technique is used in order to obtain a stationary point. Then a global technique should be applied in order to escape from this point and find an initial guess for the new round of a local search.

2) Points obtained by a global technique are used as initial points for a local search.

Some methods for global optimization are fast enough in small dimensions. This observation gives rise to a completely new combination of local and global techniques that is discussed in the lecture. Namely, we suggest to apply a global technique for the search for the descent in dimensions higher than one, using a local approximation of the function at the point at hand.

We use the cutting angle method for the global search and the discrete gradient technique for a local approximation.

Numerical experiments confirm that the suggested approach is beneficial for minimization of non smooth functions with many shallow local minima. Using this technique we succeed to find new best known values for some well-known clustering problems.

Tuesday, July 6

TB04-1, 11:00 – 11:45 **Salon des Roses A**

Chair: Gerhard Wäscher

Prof. Teodor Gabriel CRAINIC
Dept. Management and Technology, U.Q.A.M., Center for Research on Transportation, Univ. of Montreal, theo@crt.umontreal.ca

"Optimisation Issues in Auctions".

Auctions are one of the oldest and most trusted mechanisms for setting up markets for exchanges of goods and services and are an essential component of the emerging electronic society. Combinatorial auctions form an important class of market mechanisms that target exchanges of bundles of multiple heterogeneous interrelated items. Operations Research methods are an essential ingredient of efficient e-markets, particularly when combinatorial auctions are contemplated. We briefly present auctions, market mechanism design issues, and the role of Operations Research. We then focus on three main topics: market clearance formulations for various combinatorial auction settings, design of progressive combinatorial auctions, and decision support tools to help participants make profitable bidding decisions.

Tuesday, July 6

TB05-1, 11:00 – 11:45 **Salon des Roses B**

Chair Valery Gordon

Prof. Philippe VINCKE
Université Libre de Bruxelles, Service de Mathématique de la Gestion, CP210/01, Bd du Triomphe, 1050 Brussels, Belgium, pvincke@ulb.ac.be

"Robustness in decision-making"

All the analysts who have to treat decision problems know that the numerical values used in the models are questionable. These values result from assumptions about the context of the problem, from estimations of badly known or random variables, from forecasting of future events, from more or less arbitrary choices for the values of some parameters,...This inevitable uncertainty on the components of every model must be taken into account in the decision aiding process. Beside the traditional tools like stochastic approach, possibility theory or fuzzy logic, the concept of robustness was introduced to express the idea that the role of the analyst is to provide the decision-maker with solutions, prescriptions or simply information which are valid for all or most sets of values considered as plausible to represent the decision problem.

We propose to illustrate this rather unexplored concept on some OR and decision problems and to present some theoretical aspects and open problems in relation with it.

Wednesday, July 7

WB02, 11:45-12:30 **Delphi Amphitheater**

Chair: Frank Plastria

Prof. Dr. Jaime BARCELO
Technical University of Catalunya, Barcelona, Spain, e-mail: jaume.barcelo@upc.es

"City logistics"

City Logistics is defined as the process of optimising the logistics and transport activities by private companies in urban areas while considering the traffic environment, traffic congestion and energy consumption. This requires a new modelling approach in which dynamic traffic simulation models should interact with the Location and Vehicle Routing and Scheduling models, to account for the applications of new technologies, like Advanced Traffic Information Systems, to deal appropriately with the real time management aspects more relevant for City Logistics. The dynamic traffic simulation models emulates the actual traffic conditions providing at each time interval the information used by the logistic model to determine dynamically the optimal routing and scheduling of the vehicle. This lecture discusses a proposal for a modelling framework in the context of real life projects.

Wednesday, July 7

WB03-1, 11:00 – 11:45 **Athena**

Chair: Jacek Blazewicz

Prof. Vangelis PASCHOS
LAMSADE, Universite Paris-Dauphine, Place du Marechal de Lattre de Tassigny, 75775 Paris Cedex 16 France, e-mail: paschos@lamsade.dauphine.fr

"Polynomial approximation for NP-hard optimization problems".

The fact that it is very unlikely that a polynomial time algorithm could ever be devised for optimally solving **NP**-hard problems, strongly motivates both researchers and practitioners in trying to find a trade-off between computational time and solution's quality for such problems; this is what it is commonly called "heuristically solving **NP**-hard problems". Heuristic computation consists of trying to find in reasonable time, not the best solution but one solution which is "near" the optimal one. Among classes of heuristic methods approximately solving **NP**-hard problems, the so-called *polynomial approximation algorithms* aim in solving a given **NP**-hard problem *in polynomial time* by computing *feasible solutions* being, under some predefined criterion, *as near as possible to the optimal ones*. The polynomial approximation theory deals with the study of such algorithms. This talk presents in a first time approximation algorithms for some classical examples of **NP**-hard problems. In a second time, it shows how classical notions and tools of complexity theory, such as polynomial reductions, can be matched with polynomial approximation in order to devise structural results for the class of **NP**-hard optimization problems. Finally, it presents a quick description of what it is commonly called inapproximability results. Such results provide limits on the approximability of the problems tackled.

Semi-Plenary Sessions

Wednesday, July 7

WB03-2, 11:45 – 12:30 **Athena**

Chair: Jacek Blazewicz

Prof. Dr. Erwin PESCH
Faculty of Economics and Business Administration, Institute of Information Systems, University of Siegen, Germany, e-mail: Erwin Pesch <pesch@fb5.uni-siegen.de>

"Constraint Programming in Scheduling"

In recent years constraint programming techniques have been shown to be highly effective to solve difficult scheduling problems. Problem specific knowledge, incorporated by problem specific heuristics, has to be introduced into general problem solvers. We describe how to use different inference techniques in order to accelerate exact solution methods, i.e. we introduce constraint propagation techniques that actively exploit the constraint set to reach a certain level of consistency. This model based local reasoning over the constraint set makes problem specific knowledge, which is implicitly contained in the model description, explicitly available for branching or bounding. Impressive results for machine scheduling (job shop, open shop) and resource constrained project scheduling and its applicability in practice will be presented.

Wednesday, July 7

WB04-1, 11:00 – 11:45 **Salon des Roses A**

Chair: Marc Sevaux

Prof. Jan WEGLARZ and Prof. Jarek NABRZYSKI
Institute of Computing Science, Poznan University of Technology, Piotrowo 3a 60-965 Poznan, POLAND, {Jan.Weglarz,Jarek.Nabrzyski}@cs.put.poznan.pl

"Grid Resource Management – Multiobjective Issues"

Grid resource management systems should take into consideration the application requirements and user preferences on one hand and Virtual Organizations (VOs) polices on the other hand. In order to satisfy both, users and resource owners, many metrics, criteria and constraints are to be introduced to formulate multicriteria strategies for Grid resource management problems. In this paper we argue that Gird resource management is multicriteria in nature and as such it requires multicriteria decision support. We present three aspects of the entire resource management process: (i) provisioning of the resource management system with all the necessary information concerning accessible resources, application requirements and users preferences, (ii) making decisions that map tasks to resources in the best possible way, (iii) controlling the applications and adapting to changing conditions of the grid environment.

Semi-Plenary Sessions

Wednesday, July 7

WB04-2, 11:45 – 12:30 **Salon des Roses A**

Chair: Marc Sevaux

Prof. Panos PARDALOS
ISE Department, University of Florida, U.S.A., Gainesville, FL 32611 USA,
(email: pardalos@cao.ise.ufl.edu), (http://www.ise.ufl.edu/pardalos)

"Optimization Issues in e-Commerce"

Electronic commerce, or E-commerce as it is commonly referred to, is the leveraging of internet-based applications, resources, technology and infrastructure, both internally and through collaborative linkages with trading partners, for maximum efficiency in all aspects of business activities. E-commerce and supply chain have become the core activities of today's global economy. The E-commerce era and the internet in particular have created numerous opportunities for applying optimization techniques to solve a variety of problems arising in supply chain management, network infrastructure and quality of service, advertising, and pricing.

Wednesday, July 7

WB05-1, 11:00 – 11:45 **Salon des Roses B**

Chair: Janos Fodor

Dr. Sigurdur OLAFSSON
Department of Industrial Engineering, Iowa State University,
email: olafsson@iastate.edu, http://www.public.iastate.edu/~olafsson

"Operations Research and Data Mining"

This talk surveys the state-of-the-art in operations research and data mining and discuses promising future research directions in this area. The field of data mining has recently seen an explosion of interest from operations researchers, and many data mining problems have been formulated and solved as optimization problems. This includes data discretization, attribute selection, decision tree pruning, and data visualization. To date, the majority of the work in the area has focused on algorithm design, for example using optimization algorithms for data mining, but it has also become clear that data mining can play an important role in operations research application areas, including e-commerce, supply chain management, and planning and scheduling. Both sides of this intersection between operations research and data mining are covered by the talk.

Semi-Plenary Sessions

Wednesday, July 7

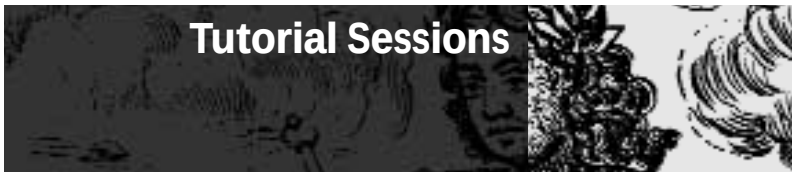
WB05-2, 11:45 – 12:30 **Salon des Roses B**

Chair: Janos Fodor

Prof. Constantin Zopounidis, Dr. Michael Doumpos
Technical University of Crete, Dept. of Production Engineering and Management,
Financial Engineering Laboratory, University Campus, 73100 Chania, Greece,
E-mail: kostas@dpem.tuc.gr, mdoumpos@dpem.tuc.gr

"Recent advances on computational classification methods"

Classification problems arise in many decision making fields. This has motivated an increasing research interest over the last two decades, which has led to important methodological advances on the construction of efficient classification models. Operations research and computational techniques have played a crucial role in the development of this field. The aim of this to talk is to provide an up-to-date survey of the major advances made in the field of classification research. The survey covers all aspects of the classification problem, including modeling forms, model development and validation techniques, feature selection, model combination strategies and real-world applications.



Tuesday, July 6

TB04-2, 11:45 – 12:30 **Salon des Roses A**

Chair: Gerhard Wäscher

Hannele WALLENIUS
Helsinki University of Technology, Department of Industrial Engineering and Management, POB 9500, 02015 HUT, FINLAND, Email: hannele.wallenius@hut.fi
Jyrki WALLENIUS
Helsinki School of Economics, POB 1210, 00101 Helsinki, FINLAND,
Email: walleniu@hkkk.fi

"Emerging Multiple Issue e-Auctions"

We review the emerging field of multiple issue e-auctions and discuss their design features and performance criteria. We primarily consider B2B transactions in a reverse auction, that is procurement setting. In traditional auctions, the matching of buyers and sellers is typically based just on price. However, when there are quality differences in the merchandize and differences in the terms of the transaction, which are common in RFQs (Request for Quote), additional issues besides price should be considered. Such multiple issue, multiple unit e-auctions/negotiations, and their characteristics are the focus of our tutorial. We also discuss the role that OR has played and undoubtedly will play in the design and implementation of such e-auctions.

Tuesday, July 6

TB05-2, 11:45 – 12:30 **Salon des Roses B**

Chair: Valery Gordon

Dimitris Bertsimas
Professor of Operations Research at the Sloan School of Management,
Email: dbertsim@mit.edu, Phone: (617) 253-4223, Fax: (617) 258-7579
Mailing address: Sloan School of Management, Bldg E53-359, Massachusetts Institute of Technology, Cambridge, MA 02139, USA

"Robust Optimization: A Tractable Theory of Stochastic Optimization"

We propose an approach to address optimization under uncertainty that
(a) unlike dynamic and stochastic programming does not suffer from the curse of dimensionality,
(b) allows explicit control of the trade-off of robustness and optimality, and
(c) inherits the computational complexity of the underlying deterministic problem.
Examples of concrete results include:
(a) the robust counterpart of a linear programming problem (LP) is still an LP and of a mixed integer programming problem (MIP) is still a MIP of comparable size.
(b) The robust counterpart of a polynomially solvable 0-1 discrete optimization problem remains polynomially solvable. In particular, robust matching, spanning tree, shortest path, matroid intersection, etc. are polynomially solvable.

(c) Robust network flows can also be solved as a polynomial number of modified network flow problems.

(d) The robust counterpart of an **NP**-hard α-approximable 0-1 discrete optimization problem, remains α-approximable.

(e) Robust conic optimization problems retain their original structure. Specifically, robust second order cone problems (SOCPs) remain SCOPs and robust semidefinite optimization problems (SDPs) remain SDPs.

(f) When applied to classical supply chain optimization problems, the approach leads to tractable solutions that extend the applicability of known results and lead to deeper insights. (Joint work with Melvyn Sim and Aurelie Thiele)

EURO Management Strategic Innovation Prize (MSSIP 2004)

Chair: Robert Dyson

Wednesday, July 7

WB01, 11:00 – 12:30 **Jupiter**

The **European Association of Operational Research Societies (EURO)** is offering the Management Science Strategic Innovation Prize (MSSIP) to foster specific areas of application of Operational Research in management. The prize is intended to reward outstanding contributions in theory or in practice to a well-chosen scientific area encouraging innovative researchers and possibly entire research groups to focus their work on a domain of particular strategic interest. The prize, of value 20000 CHR is conferred in each EURO-k conference and is **sponsored by SAP AG, Germany .**

The MSSIP 2004 award will be given for an innovative contribution in the area of "*Performance Management and Benchmarking*".

Performance management and benchmarking has become a key area of concern in the public and private sectors as a way of driving the strategic direction of organisations. In the public sector the advent of league tables have become pervasive with both positive and negative effects on performance. A variety of contemporary approaches and techniques have been developed and applied by management scientists and others to improve organisational performance, most notably:

- Data envelopment analysis (DEA), a technique with its origins in economic theory but developed by management scientists to address performance issues for homogeneous groups of units (e.g. schools, bank branches) where the existence of multiple inputs and outputs makes performance measurement problematic.
- Stochastic frontier analysis, a similar method to DEA but applicable where the data is best described stochastically.
- Benchmarking, a process of seeking to identify best practice and transfer it to under-performing businesses.
- The Balanced Scorecard, an approach to developing a performance measurement system which provides a balance across a range of perspectives including efficiency, customer service, financial and innovative.

The award will be presented to the winner at the Banquet on Tuesday, July 6. The winner will make a presentation between 11:00 and 12:30 on Wednesday, July 7 in session WB1-01.

EURO Doctoral Dissertation Award (EDDA 2004)

Chair: Jean-Pierre Brans

Tuesday, July 6

TC09, 14:00 – 15:30 **Jupiter**

The new EURO Doctoral Dissertation Award (EDDA) is awarded to a young scientist on the basis of a doctoral dissertation in OR. It will be awarded to each EURO K conference.

The PhD defence should not have occurred more than one year before the submission date. The dissertation must have been defended at an European University and the author must be a personal member of an EURO member society. Multiple submissions of the same doctoral dissertation to other dissertation award activities of other societies are excluded.

The three finalists for the EDDA 2004 will make presentations on Tuesday, July 6, between 14:00 and 15:30 in session TB09, room Jupiter. The award will be presented to the winner at the Closing session on Wednesday, July 7, between 16:00 and 17:30.

Best Discussion Presentation Poster Award (BDPPA 2004)

Chair: Raymond Bisdorff

Wednesday, July 7

WD01, 16:00 – 17:30 **Jupiter**

The organizers of the EURO XX Conference propose a new category of participation in an EURO-k Conference called discussion presentations, a type of participation organized in the style of the prestigious natural science conferences. Authors of discussion presentations are first requested to elaborate a poster of approximative size Din A0 that are exhibited for one day on a specially reserved poster space in the lobby of the Jupiter room, a space where all participants of the Conference will necessarily pass by. Secondly, they are furthermore requested to make the same day a 30 minutes presentation of your work in front of their poster panel. These presentations are explicitly scheduled in the Conference Programme as a parallel session. (see Parallel Sessions Section below).

To encourage this new type of submission the Conference organizers offer the Best Poster Award (BPA). The BDPPA 2004 will be granted during the Closing session and consists in a diploma and a prize of 1000 Euros.

To be eligible for this award, the authors of accepted discussion presentations were asked to submit via the conference web site a two pages (A4) abstract of their presentation and a digital picture of the poster. A EURO jury will evaluate the posters before the Conference and on site.

The evaluation criteria are the following:

a) scientific quality,

b) contribution to theory/practice of OR,

c) originality,

d) presentation quality.

The award will be presented to the winner during the Closing Session on Wednesday, July 7, between 16:00 and 17:30 in session WD01.

PROGRAMME OVERVIEW

Rooms	Monday July 5				Tuesday July 6				Wednesday July 7			
	MA	MB	MC	MD	TA	TB	TC	TD	WA	WB	WC	WD
	9:00-10:30	10:45-12:30	14:00-15:30	16:00-17:30	9:00-10:30	11:00-12:30	14:00-15:30	16:00-17:30	9:00-10:30	11:00-12:30	14:00-15:30	16:00-17:30
Jupiter		Opening Session								Semi-Plenary Sessions		Closing Session
Delphi	Scheduling: Flow shop I (C01a)		Scheduling : Flow shop II (C01b)	Scheduling : Single machine (C02)	Scheduling : Parallel machines (C03)	Semi-Plenary Sessions	Scheduling : Multi-objective and uncertainty (C04)	Scheduling : Batch and groups (C04b)	Capacity Planning (C07)		Software for OR/MS Analysis (C102)	
Athena	Comb. Opt. : Routing (C09)		Comb. Opt. : Applications of Heuristics (C13)	Comb. Opt. : Integer Programming Models (C11)	Comb. Opt. Set Partitioning (C10)		Combinatorial Optimization (C14)		Graphs and Networks I (C41)		Graphs and Networks II (C42)	
Salon des Roses A	EWG-MCAD: Applications in Finance (C03)		EWG MCAD: Environmental Issues (C15)	EWG MCAD: Applications (C13)	MCDA Applications in e-business (C58)		EWG MCAD: Multi Criteria Aid for Decision (C16)	MCAD and Artificial Intelligence I (C07bis)	MCAD and Artificial Intelligence II (C09bis)		EWG MCDA: Bipolar Approach (C01)	
Salon des Roses B	Vector Optimization (C61)		Strategic Planning and Management (C30)	EWG ESIGMA: Uncertainty and Problem Structuring (C27)	EWG ESIGMA: Value Measurement and Decision Conferencing (C28)		Decision Theory and Analysis (C34)	Decision Support Systems (C22)	Group Decision Making and Auctions I (C06b)		Group Decision Making and Auctions II (C06b)	
Nafsica A	Supply Chain Management I (C92)		Supply Chain Management II (C93)	Supply Chain Management III (C94)	Supply Chain Management IV (C15)		Supply Chain Management V (C95)	Product & Inventory Systems I (C67)	Product & Inventory Systems II (C68)		Product & Inventory Systems III (C69)	
Nefeli B	Data Envelopment Analysis I (C09)		Data Envelopment Analysis II (C17)	Data Envelopment Analysis III (C18)	Data Envelopment Analysis IV (C19a)			Project Management and Scheduling I (C01)	Project Management and Scheduling II (C74)		Project Management and Scheduling III (C74b)	
Nafsica B	Cutting & Packing I (C04)		Cutting & Packing II (C04b)	Meta-Heuristics I (C16)	Meta-Heuristics II (C50)		Meta-Heuristics III (C54)	Integer programming (C72)	Marketing (C51)			
Jupiter	Finance and Banking (C39)		Financial Engineering I (C02)	Financial Engineering II (C90)	Financial Engineering III (C91)		EURO Doctoral Dissertation Award finalists	Financial Modelling I (C32)	Financial Modelling II (C33)		Financial Modelling III (C34)	
Nefeli A	Health Care: Bioinformatics & Computational Biology (C18)		Health Care: Mathematical Diagnostics (C19)	Health Care (C43)	OR for electronic services I (C93)		OR for electronic services II (C65)	OR for electronic services III (C05)	Management Information Systems and e-Marketing (C36)		Web based information systems (C27)	
Executive Room Alpha	OR for Military and Security (C37)		Timetabling I (C84)	Timetabling II (C87)	Airline Applications I (C01)		Airline Applications II (C02)	Logistics (C98)	Analytical Hierarchy Process I (C08)		Analytical Hierarchy Process II (C04)	
Executive Room Beta	Mathematical Programming I (C53)		Mathematical Programming II (C53)	Non linear programming I (C96)	Global optimization (C99)		Non linear programming II (C73)	Continuous optimization I (C45)	Continuous optimization II (C17)		Continuous optimization III (C86)	
Executive Room Gamma	Computational Methods in Transportation and Logistics (C85)		Competitive Location (C47)	Location (C48)	Freight transportation and vehicle routing (C101)		Routing (C80)		Urban traffic (C89)		Traffic Issues (C46)	
Executive Room Delta	Fuzzy Sets and Systems (C37)		Stochastic Models I (C87)	Stochastic Models II (C88)	Knowledge Engineering and Management (C40)		Quality Management (C75)	Human Resource Management (C44)	Reliability and Risk Analysis (C76)		Maintenance and Stochastic Models (C77)	
VIP Lounge	Dynamic Programming (C71)		Telecommunication I (C11)	Telecommunication II (C104)			Network Design and Optimization (C95)	Economic Modelling (C26)	Data Mining (C21)		OR and the Internet (C69)	
Syndicate Room A	Environment, Manage Natural Resources (C208)		Forestry Management I (C63)	Forestry Management II (C64)								
Jupiter Lobby	Discussion Presentations I		Discussion Presentations II	Discussion Presentations III	Discussion Presentations IV		Discussion Presentations V	Discussion Presentations VI	Discussion Presentations VII		Discussion Presentations VIII	

Personal Planner

Monday	Tuesday	Wednesday
MA: 9:00 – 10:30	TA: 9:00 – 10:30	WA: 9:00 – 10:30
MB: 10:45 – 12:30	TB: 11:00 – 12:30	WB: 11:00 – 12:30
MC: 14:00 – 15:30	TC: 14:00 – 15:30	WC: 14:00 – 15:30
MD: 16:00 – 17:30	TD: 16:00 – 17:30	WD: 16:00 – 17:30

How to navigate the Parallel Sessions

The parallel session listing next pages is presented chronologically by day and time slot, showing each session and the titles, authors and abstracts within each session.

The Session Codes

M	A	01
Day	*Time slot*	*Room number*

The discussion presentations are all happening in the Jupiter Lobby (Room 18) in front of the corresponding posters. Time slot and panel # for each presentation are shown for each paper.

Jupiter (full)	01
Delphi Amphitheater	02
Athena	03
Salon des Roses A	04
Salon des Roses B	05
Nafsica A	06
Nefeli B	07
Nafsica B	08
Jupiter (small)	09
Nefeli A	10
Executive Room Alpha	11
Executive Room Beta	12
Executive Room Gamma	13
Executive Room Delta	14
VIP Lounge	15
Syndicate Room A	16
Syndicate Room C	17
Jupiter Lobby	18

MA02, 9:00 – 10:30 **Delphi Amphitheater**
Scheduling: Flow shop I (C81a)

Chair: RUIZ Ruben

Paper-ID: 1359

A Simple and Effective Iterated Greedy Algorithm for the Flowshop Scheduling Problem

RUIZ Ruben
Universidad Politecnica de Valencia Spain

STUTZLE Thomas
Darmstadt University of Technology (TUD) Germany

MAROTO Concepcion
Universidad Politecnica de Valencia Spain

Contributed paper

Keywords: Metaheuristics, Scheduling

Over the last decade many metaheuristics have been applied to the flowshop scheduling problem, ranging from Simulated Annealing or Tabu Search to complex hybrid techniques. Some of these methods provide excellent results at the expense of being utterly complicated. In fact, several published methods require long implementation times, use problem specific speed-up techniques that cannot be applied to slight variations of the original problems, and often re-implementations produce results that are quite different from the original ones. In this work we present a metaheuristic that is simple to implement and produces very good results in comparison to state-of-the-art methods.

Paper-ID: 261

A simulated annealing method for the flow-shop with a new blocking constraint

MARTINEZ Sergio
France

GUERET Christelle
Ecole des Mines de Nantes France

SAUER Nathalie
IRCCyN/Ecole des Mines de Nantes France

Contributed paper

Keywords: Combinatorial Optimization, Metaheuristics, Scheduling

We study the flowshop problem without intermediate buffer capacity and with a new blocking constraint met in several industrial applications. Contrary to the classical blocking situations, where a machine remains blocked by a job until this job starts on the next machine in the routing, with the new blocking constraints considered here, the machine remains blocked by a job until its operation on the downstream machine is finished and it leaves the machine. A simulated annealing algorithm based on a neighborhood initially used to solve permutation Flowshop problems, is proposed to minimize the makespan of this problem.

Paper-ID: 947

New network type algorithms for the just-in-time two machine flow-shop scheduling problem

HONDA Naoya
Osaka University Japan

ISHII Hiroaki
Osaka University Japan

Contributed paper

Keywords: Scheduling

The paper deals with two machine flow-shop scheduling problem to maximize the number of just-in-time jobs. This network type algorithm is derived from binary tree structure. We define the superiority relation of a partial schedule, and propose the efficient rule that searches only partial schedules extensible to optimal schedules. We show that this algorithm finds an optimal schedule for this problem in polynomial time.

Paper-ID: 36

Flowshop Simulator

TARI Megdouda
DAHMANI Abdelnasser
University of Bejaia Algeria

Contributed paper

Keywords: Scheduling, Simulation, Software for OR/MS Analysis

Descriptive sampling refined is a procedure based on descriptive sampling, it produces blocks of descriptive samples of prime size. The advantages of descriptive sampling refined is that it eliminates the problems of descriptive sampling. In this paper, we analyse a production system of type ''Flowshop" by discrete event simulation method using three different sampling procedures namely random sampling, descriptive sampling and descriptive sampling refined. Consequently, we design and realise a software package using a Delphi language to solve flowshop related scheduling problems which establishes its performance measures and the comparaison of these methods if a real situation is available.

MA03, 9:00 – 10:30 — Athena

Combinatorial Optimization: Routing (C09)

Chair: GOLDENGORIN Boris

Paper-ID: 1566

Tolerance Based Algorithms for the TSP

GOLDENGORIN Boris
Netherlands

TURKENSTEEN Marcel
University of Groningen Netherlands

Contributed paper

Keywords: Combinatorial Optimization

In this talk we study extremal properties of tolerances in combinatorial optimization and apply them in order to improve Branch-and-Bound type algorithms. We show that tolerances of an optimal solution of the Assignment Problem (AP) constitute a powerful measure relating the entire set of AP optimal solutions to a common arc of the AP optimal solutions and Asymmetric Traveling Salesman Problem (ATSP). We derive new tighter lower bounds and branching rules based on exact and approximate bottleneck upper tolerance values of the AP. Computational experiments are very promising for uniformly, randomly generated and quasi symmetric ATSP instances.

Paper-ID: 1339

Shortest paths reoptimization: an auction algorithm

FESTA Paola
University of Naples FEDERICO II Italy

PALLOTTINO Stefano
University of Pisa Italy

Contributed paper

Keywords: Combinatorial Optimization, Transportation and Logistics

Shortest paths reoptimization problems are sequences of shortest path problems. Each problem differs slightly from the previous one and can be solved by applying an algorithm that efficiently uses information resulting from previous computation. For example, in case of increasing of arc costs, the optimal solution of the previous problem is dual feasible, but can be primal infeasible. In this talk, shortest path reoptimization methods for arc cost increases and origin changes are reviewed, and the collection of dual ascent approaches is enlarged by including an auction algorithm. Preliminary computational results obtained by comparing different implementations will be presented.

Paper-ID: 712

Four-point conditions for the solvable cases of the travelling salesman problem.

DEINEKO Vladimir
United Kingdom

Contributed paper

Keywords: Combinatorial Optimization, Complexity and Approximation, Mathematical Programming

In many solvable cases of the travelling salesman problem (TSP) distance matrices satisfy the so-called four-point conditions. We consider all possible four-point conditions and analyze whether the TSP with the corresponding distance matrices can still be solved in polynomial time. For some cases the answer is negative: the problem remains NP-hard. There are, however, special cases when the TSP can be solved efficiently. We describe a new exponential neighbourhood that can be searched in polynomial time, and show that a solution for the TSP restricted to a class of matrices satisfying some four-point conditions can be found in this neighbourhood.

MA04, 9:00 – 10:30 **Salon des Roses A**

EWG MCAD: Applications in Finance (O03)

Chair: ZOPOUNIDIS Constantin

Paper-ID: 908

An integrated approach for the development of credit scoring models

DOUMPOS Michael
Technical University of Crete Greece

EFREMIDIS Yannis
ICAP Greece

KOTSAFTIS Leonidas
ICAP Greece

ZOPOUNIDIS Constantin
Technical University of Crete Greece

Paper in an organized session

Keywords:, Finance and Banking, Financial Modelling, Multi-Criteria Decision Aids

The implementation of credit scoring models (CSM) provides substantial support in the credit granting process of any business entity. A CSM maps the characteristics of a credit applicant to a rating representing the likelihood of default. This study presents an integrated analysis on the development of real-world credit scoring models for ICAP SA, which is the largest financial data, publishing and management consulting company in Greece. The analysis covers all aspects of the CSM development process, involving: (1) the definition of default, (2) data sampling, (3) model construction using MCDA techniques, and (4) model validation.

Paper-ID: 699

Combining performance and importance judgments into a collective preference disaggregation model

GRIGOROUDIS Evangelos
Technical University of Crete Greece

SPIRIDAKI Olga
Technical University of Crete Greece

Paper in an organized session

Keywords: Multi-Criteria Decision Aids, Multi-Objective Decision Making, Simulation

This paper presents the development of an ordinal regression model, combining the performance and importance judgments as expressed by a set of individuals. The model may be considered as an extension of the MUSA method, while the main purpose of the analysis is to examine whether additional information about the weights of the criteria can improve the stability of the results based only on performance judgments. For this reason, an experimental analysis phase, using Monte Carlo simulation techniques, is presented in order to test the validity and investigate the stability of the provided results.

Paper-ID: 1190

Nonlinear Hierarchical Modeling for Efficient Asset-Liability Management of Property-Liability Insurers

DASH Gordon
University of Rhode Island United States

KAJIJI Nina
University of Rhode Island United States

Paper in an organized session

Keywords: Finance and Banking, Mathematical Programming, Multi-Criteria Decision Aids

This paper presents a multi-criteria decision optimization model for property-liability insurers faced with a complex hierarchical multi-goal environment. The model presented here is a nonlinear goal programming (NLGP) formulation that explicitly solves the mean-variance (MV) efficiency problem that exists on both the asset- and liability-side of the insurer balance sheet. The model characterizes known regulatory and managerial policy constraints within an indexed financial statement that includes 7 diversifiable securities and 10 diversifiable underwriting lines. The results of solving the model produce an efficient set of insurer portfolios (balance sheets) achieved by a combination of goal setting and efficient risk management.

Paper-ID: 601

Predicting Financial Distress of UK Firms: A multicriteria Approach

PASIOURAS Fotios
Technical University of Crete Greece

ZOPOUNIDIS Constantin
Technical University of Crete Greece

DOUMPOS Michael
Technical University of Crete Greece

Paper in an organized session

Keywords: Finance and Banking, Financial Modelling, Multi-Criteria Decision Aids

Financial distress is one of the most significant threats for many firms today, as it becomes apparent by the increase in the number of business failures around the world. Despite the impressive body of research over the last 30 years there is still no generally accepted prediction model and further research is necessary. The objective of this paper is to use a MCDA approach for the development of a model capable to predict UK financial distressed firms. The classification accuracy of the model is tested in a holdout sample and a comparison is made with other classification techniques.

Parallel Sessions

Monday, July 5

MA05, 9:00 – 10:30 **Salon des Roses B**

Vector Optimization (C61)

Chair: HABENICHT Walter

Paper-ID: 85

A hybrid concept for integer linear vector optimization

HABENICHT Walter
University of Hohenheim Germany

Contributed paper

Keywords: Mathematical Programming, Multi-Objective Decision Making, EWG ESIGMA Special interest group on Multicriteria Analysis

In this paper a hybrid concept for integer linear vector optization problems is presented. The approach combines an enumerative part with cutting planes. A main problem lies in the choice of cut generating sets for the intersection cuts used here. The size and the shape of these sets determine the amount of enumeration in relation to the number of cuts in this approach. The approach is illustrated by an example. First experiences with different solution strategies are reported.

Paper-ID: 398

Prioritized objective functions for the planning of backlogs and inventory in multi-product single-stage lot-sizing with setup times

CLARK Alistair
University of the West of England United Kingdom

YAGER Ronald
Iona College United States

Contributed paper

Keywords: Multi-Objective Decision Making

The setup scheduling of a production line is formulated as a mathematical programming model that minimises a weighted sum of both backlogs of demand and inventory, with the unit penalty of the inventory being a function of the backlog. Using this formulation we are able to introduce a prioritization of the criteria. If the inventory unit penalty is constant, then the resulting model is a mixed integer programme, but other penalty functional forms are possible, resulting in non-linear objective functions and a variety of trade-offs between inventory and backlogs. A number of alternative forms are proposed and computationally investigated.

Paper-ID: 785

Solving Discrete Quadratic Fractional Vector Maximum Problem

MOULAI Mustapha
Faculty of Mathematics / USTHB Algeria

Contributed paper

Keywords: Multi-Objective Decision Making, Programming, Integer, Programming, Nonlinear

In this paper, we propose an exact algorithm for solving multi-objective integer quadratic fractional programs in which each objective is to minimize a ratio of two quadratic functionals over a set of integer points contained in a convex polytope. This algorithm is based on a cutting plane technique and a related integer linear fractional problem is constructed in order to obtain an optimal solution of the single objective integer quadratic fractional problem. The proposed algorithm able to identify the set of all efficient solutions of the main problem converges in a finite number of iterations. A numerical illustration is included.

Paper-ID: 985

Compensatory fuzzy programming for decentralized two-level linear fractional programming (DTLLFP) problems

AHLATCIOGLU Mehmet
YILDIZ TECHNICAL UNIVERSITY Turkey

TIRYAKI Fatma
YILDIZ TECHNICAL UNIVERSITY Turkey

Contributed paper

Keywords: Analytic Hierarchy Process, Fuzzy Sets and Systems, Multi-Objective Decision Making

This paper presents compensatory fuzzy programming for DTLLFP problem with a single decision maker (DMo) at the upper level and multiple DMs at the lower level. With AHP, DMo assigns weights to objectives at the lower level. Thanks to these weights, an equivalence among the satisfactory levels for objectives at two levels is formed. Besides, compensatory operators are introduced for adjusting the decision making process between the two levels and also between the decision makers of the lower level. Consequently, a set of compromise solutions is offered to DMo.

MA06, 9:00 – 10:30 **Nafsica A**

Supply Chain Management I (C92)

Chair: ITTMANN Hans.W.

Paper-ID: 1648

Trends in Supply Chain Management in South Africa

ITTMANN Hans.W.

Contributed paper

Keywords: Supply Chain Management

South Africa is located at the southern tip of Africa and is therefore located equi-distant from its three main market namely the Americas, Europe and Asia. For the country to become a player in the world market it is imperative that it should have world class supply chains. This paper will address the state of logistics/supply chain management in South Africa and how it has changed, developed and progressed over the last number of years. The use of software tools such as optimization tools, advanced planning systems, etc will be highlighted.

Paper-ID: 214

Optimal ordering, pricing, discount policies in a two-party supply chain

HSIEH Chung-Chi
Taiwan, Province Of China

YANG Jung-Sheng
National Cheng Kung University Taiwan, Province Of China

Contributed paper

Keywords: Supply Chain Management

This study develops ordering, pricing, and discount policies in a supply chain that consists of a manufacturer and a retailer. The retailer orders the products from the manufacturer at the beginning of the selling season, and will incur shortage during the selling season, if the ordered quantity falls short of demand; it will incur inventory, if the order quantity exceeds the demand, and will sell the inventory at a discounted price after the selling season. This study analyzes and determines the manufacturer's pricing policy and the retailer's ordering and discount policies in the absence and presence of coordination.

Paper-ID: 1451

Single-Supplier/Multiple-Buyer Supply Chain Coordination with Vertical Information Sharing

KARABATI Selcuk
SAYIN Serpil
Koc University Turkey

Contributed paper

Keywords: Supply Chain Management

We address the coordination problem in a single-supplier/multiple-buyer supply chain with vertical information sharing. The supplier has access to complete information to coordinate the supply chain and desires to implement a coordinated solution. We model buyers_ expectations in line with their limited view of the supply chain under vertical information sharing. These expectations are then incorporated into the modeling of the coordination problem, which results in a more general constrained Stackelberg game. We discuss alternative efficiency sharing mechanisms and propose methods to design the associated discount schemes that take buyers' expectations into account.

MA07, 9:00 – 10:30 — Nefeli B

Data Envelopment Analysis I (O29)

Chair: PODINOVSKI Victor

Paper-ID: 1556

Exploring the Use of Data Envelopment Analysis for Evaluation in Primary Health Care: An Application to Diabetes Service Delivery

AMADO Carla
Universidade do Algarve

DYSON Robert
University of Warwick United Kingdom

Paper in an organized session

Keywords: Data Envelopment Analysis, Health Care

In this paper, we discuss the development of a conceptual framework for performance assessment in primary health care. This framework aims to establish a link between local needs, resources used, services delivered and outcomes achieved in primary care. In the second part, we discuss the application of this conceptual framework to formatively evaluate a sample of GP surgeries in England in terms of diabetes care delivery. Data Envelopment Analysis was used to measure efficiency, service effectiveness and cost effectiveness. Equity of services utilization was measured as the ratio of services utilized to the local population needs.

Paper-ID: 1031

Performance Measurement in Retailing Organisations Using Data Envelopment Analysis

VAZ Clara
Instituto Polittecnico de Braganza

CAMANHO Ana
Universidade do Porto

Contributed paper

Keywords: Data Envelopment Analysis, Programming, Linear

This study describes an application of DEA to the assessment of operational and commercial efficiency of grocery stores from a major retailer. The operational perspective assesses the sales and income generated at the store. The commercial perspective assesses the sales of individual sections within the store. The effect of environmental variables on store performance, such as the population and the number of competitors in the surrounding area, is also analysed. These models are refined with the inclusion of weight restrictions to reflect accurately the relative importance of the input and output variables on the store performance.

Paper-ID: 943

VRS or FDH: any alternative?

PODINOVSKI Victor
University of Warwick United Kingdom

Paper in an organized session

Keywords: Data Envelopment Analysis

In this paper we suggest an alternative to the extreme assumptions of the VRS and FDH technologies used in performance measurement. The suggested method is based in the notion of selective convexity, which applies when some inputs and outputs satisfy the convexity axiom, and some do not. Production units can be combined only if they are identical with respect to the inputs and outputs that do not satisfy convexity. The VRS and FDH models are the two extreme cases in the suggested range of DEA models. Operationally, these DEA models are solved as mixed integer linear programs.

Parallel Sessions

Monday, July 5

MA08, 9:00 – 10:30 **Nafsica B**
Cutting & Packing I (O04)

Chair: OLIVEIRA Jose Fernando

Paper-ID: 671

An algorithm for the non-guillotinable two-dimensional packing problem

PINTO FERREIRA M. Eduarda
ISEP Portugal

OLIVEIRA Jose Fernando
FEUP / INESC Porto Portugal

Paper in an organized session

Keywords: Cutting and Packing

The problem of cutting a rectangle into smaller rectangular pieces of given sizes is known as the two-dimensional packing problem. We are going to present an approach to this problem, based on the algorithm introduced by S???????ndor P. Fekete and Jörg Schepers, which uses a graph-theoretic characterization of a feasible two-dimensional orthogonal packing problem. This characterization, combined with good heuristics for dismissing infeasible subsets of boxes, allows to the construction of optimal solutions for this type of two-dimensional packing problems. Finally, we present computational results for the implemented algorithm.

Paper-ID: 694

An enumeration scheme to generate constrained exact checkerboard patterns

YANASSE Horacio
KATSURAYAMA Daniel
INPE Brazil

Paper in an organized session

Keywords: Combinatorial Optimization, Cutting and Packing

We propose an enumeration scheme to determine constrained exact checkerboard patterns. Checkerboard patterns are a special class of two-stage guillotine patterns that do not need recuts. Being easier to cut, they are of interest in high demand settings when the machine is a bottleneck for production. Initially a good combination of the restricted panels is generated, taking into account their values and area and, the area of the larger board from which these panels are to be cut; afterwards, it is verified whether a checkerboard pattern can be generated with this combination.

Paper-ID: 592

An integrated approach to vehicle routing and container loading problems

MOURA Ana
ESTIG Portugal

OLIVEIRA Jose Fernando
FEUP / INESC Porto Portugal

Paper in an organized session

Keywords: Cutting and Packing, Metaheuristics, Routing

This work approaches the integrated resolution of two different and well-known optimization problems: the VRPTW and the container loading problem. Having specific constraints and different objectives, the VRPTW aims to minimize the total distance travelled by the vehicles while the container loading problem aim, to maximize the container space usage. A bi-objective nature of the problem arises with the presence of these two different conflicting objectives. It is presented a basic algorithm compound by two constructive heuristics (one for each optimization problem) that generates an initial solution. Afterwards a GRASP meta-heuristic is applied in order to improve the global results.

Paper-ID: 352

New ILP Approaches for 3-Staged 2D Bin Packing

RAIDL Günther
Vienna University of Technology Austria

PUCHINGER Jakob
Vienna University of Technology Austria

Contributed paper

Keywords: Combinatorial Optimization, Cutting and Packing, Mathematical Programming

We consider a packing problem appearing in glass manufacturing. Rectangular elements need to be cut from stock-sheets. The aim is to find a feasible 3-staged cutting pattern that minimizes the number of needed stock-sheets. We present an ILP model which is effective as long as the number of different heights the elements have is not too large. The disadvantage of having exponentially many variables is avoided in a second model needing O(n) variables and constraints only. Finally, we discuss a branch-and-price approach in which the second model is used for solving the pricing subproblem. All approaches are experimentally compared.

Parallel Sessions

Monday, July 5

MA09, 9:00 – 10:30 **Jupiter (small)**
Finance and Banking (C29)

Chair: KASCELAN Vladimir

Paper-ID: 804

Fee Structures Comparisons of the CEECSD (Central and Eastern European Central Securities Depositories) Agencies

KASCELAN Vladimir
Faculty of Economics Serbia and Montenegro

Contributed paper

Keywords: Finance and Banking

Fee schedule is one of the most sensitive and important part of any kind of business, securities depository also. In this paper I compare fees for the services which Central securities agencies from the Central and Eastern Europe region, render to the customers. It is concluded that in the most cases fees are very similar, especially when the same methodology is used. Countries which are equally economic developed and with approximately the same population, they have similar incomes. Not well developed countries, particularly small one, have less members, small collection rate for their services and consequently worse financial condition.

Paper-ID: 386

DIAGNOSIS & IMPROVEMENT OF SERVICE QUALITY IN THE INSURANCE INDUSTRIES OF GREECE & KENYA

TSOUKATOS Evangelos
TEI of Crete, School of Management and Economy Greece

MARWA SIMMY
LANCASTER UNIVERSITY - LANCASTER (UK)

Contributed paper

Keywords: Finance and Banking, Quality Management, Service Operations

Previous research has confirmed that there is widespread customer dissatisfaction in the insurance industry, stemming from insurers' failure to satisfy customers' needs. Ignorance of customers_ satisfaction and of service quality largely account for this. Therefore, further research to improve the industry's understanding of service quality is imperative. Using data from the Greek and Kenya's insurance industries we measure service quality with a view to identifying its determinants and existing gaps. We put forward our conclusions on how service quality is perceived by consumers in the two, so much different, markets. We then recommend quality improvement strategies in each case.

Paper-ID: 1351

Internet banking and generic credit scoring

ANDREEVA Galina
University of Edinburgh

Contributed paper

Keywords: Decision Support Systems, Finance and Banking, Risk Analysis and Management

The recent developments in Internet banking and the on-going European political and economic integration bring new challenges for credit scoring. Among them is the necessity to assess the risk of lending to customers from different European countries. A possible solution is a single generic model that would fit a population consisting of heterogeneous national segments. The presentation explores the possibility of applying a generic model to applicants for a revolving store card from three countries (Belgium, Germany the Netherlands). The national risk patterns are investigated, and different modelling approaches (logistic regression and survival analysis) are examined.

MA10, 9:00 – 10:30 **Nefeli A**

Health Care: Bioinformatics & Computational Biology (O18)

Chairs: METU Ankara Turkey, PICKL Stefan, WEBER Gerhard-Wilhelm

Paper-ID: 1655

Optimization and Stability of Gene-Expression Patterns and Their Networks

WEBER Gerhard-Wilhelm
METU Ankara Turkey
AKHMET Marat
OKTEM Hakan
YILMAZ F. Bilge
Middle East Technical University Turkey

PICKL Stefan
UGUR Omur
Middle East Technical University Turkey

Paper in an organized session

Keywords: Bioinformatics, Programming, Nonlinear

Many problems in the field of bioinformatics consist in the analysis of gene-expression data. We develop a mathematical model of the development in time of gene-expression patterns by means of a system of differential equations. We study that system in terms of stability. The dynamics gives rise to the definition of gene networks; their connectedness structure and further items are important. In fact, the study of this vidid field of networks, of Boolean or with feedback, leads to an improvement of our modelling and analysis of time-discrete and -continuous systems likewise by delays and impulses. We conclude with an outlook.

Paper-ID: 1651

Structure-based Drug Design using Advanced Modeling and Optimization

TURKAY Metin
Koc University Turkey

Contributed paper

Keywords: Bioinformatics

The design of chemicals that will act as active agents in curing certain illnesses is one of the primary concerns in the emerging biotechnology field. These active agents must interact with the protein or a family of proteins that are closely related to the disease. The objective of this project is to develop mathematical programming approaches to design small molecule drug candidates that will pack the active site of the target protein as closely as possible.

Paper-ID: 1249

Tabu search approach for DNA sequencing with isothermic libraries

BLAZEWICZ Jacek
FORMANOWICZ Piotr
KASPRZAK Marta
Politechnika Poznanska Poland

MARKIEWICZ Wojciech T.
Instytut Chemii Bioorganicznej PAN Poland

SWIERCZ Aleksandra
Politechnika Poznanska Poland

Contributed paper

Keywords: Bioinformatics, Metaheuristics

In this paper, a problem of isothermic DNA sequencing by hybridization (SBH) is considered. In isothermic SBH a new type of oligonucleotides are used which have equal melting temperatures. From the computational point of view the problem of isothermic DNA sequencing with errors is hard, hence, there is a need for developing good heuristic approaches. The aim of the paper is to propose a heuristic algorithm based on tabu search approach. The algorithm solves the problem with both positive and negative errors. Results of an extensive computational experiments are presented, which prove the high quality of the proposed method.

MA11, 9:00 – 10:30 — Executive Room Alpha
OR for Military and Security (C57)

Chair: STAHEL Albert A.

Paper-ID: 1199

TNDM-the expansion of a simulation model

STAHEL Albert A.
Swiss Military Academy ath the ETHZ Switzerland

Contributed paper

Keywords: Military Operations Research, Simulation

TNDM (Tactical Numerical Deterministic Model) was developed in the seventies by the late American Colonel Trevor N. Dupuy. He described this model in his book "Numbers, Predictions and War",which was published in 1979.This model is based on the QJMA-Method (Quantitative Judgement Method of Analysis). With the of QJMA, the simulation model TNDM calculates the course and the outcome of a combat between the deployed military units. Until recently, TNDM and QJMA took into consideration only data on NATO and WAPA units. The new software is programmed in JAVA which allows TNDM to be run from any PC.

Paper-ID: 795

BLACK OPERATING HOLES AND LAND WARRIOR INFORMATION SYSTEMS

PETRANTONAKIS Pavlos
PANAYIOTOPOULOS John-Christ
University of Piraeus Greece

Contributed paper

Keywords: Disaster and Crisis Management, Military Operations Research, Risk Analysis and Management

The rapid rate of growth of informatics the last decade has enormously influenced the sensitive area of National Defense. It is essential to predict the dangers that a Defense System has to face.The main scope of this papers is to present the structure of the Land Warrior as an Information System which functions in an Irregular Dynamic Data Area. Moreover it is presented a research on the Threats that the Land Warrior faces and the Countermeasures that are necessary for his defense based on a new methodology of Disaster Prevention. Additionally, formulation of the problem and corresponding technique is given.

Paper-ID: 798

Crime analysis and decision support in the South African Police Service: Enhancing capability to prevent and solve crime

STYLIANIDES Theodoulos
South Africa

Contributed paper

Keywords: Decision Support Systems, Innovation, OR/MS and the Public Sector

This paper describes a project aimed to enhance capability in crime analysis and decision support systems (DSS) within the South African Police Service (SAPS). The project deals with the development and piloting of innovative analytical methods and DSS tools which can be applied at the operational, tactical and strategic levels within SAPS - each with its own information requirements. The following activities are described: automated crime mapping, target performance analysis, forecasting, shift and roster models, patrol simulation model, linkage analysis, multivariate analysis to explain crime and accessibility analysis. Some significant results achieved so far are related.

Parallel Sessions

Monday, July 5

MA12, 9:00 – 10:30 **Executive Room Beta**
Mathematical Programming I (C52)

Chair: KHALID Allali

Paper-ID: 135

Approximate Subdifferentials of Value Functions

KHALID Allali
Faculté des Sciences et Techniques de Settat Morocco

Contributed paper

Keywords: Mathematical Programming, Programming, Nonlinear

It is well-known that a lot of problems in optimization and optimal control involve value functions and their subdifferentials since the sensitivity of these problems can be studied with the help of the behaviour of the subdifferentials of some associated value functions. Generally the infimum defining the value function is required to be attained near the point of interest. This paper is devoted to study, for a first important class of problems, how this condition can be removed. Here we will deal with locally Lipschitz value functions where the infimum will not be required to be attained.

Paper-ID: 142

Mathematical programming models for generating non-linear discriminant functions

GLEN John
University of Edinburgh United Kingdom

Contributed paper

Keywords: Mathematical Programming, Multi-Criteria Decision Aids

Mathematical programming (MP) discriminant analysis models are widely used to generate linear discriminant functions that can be adopted as classification models. Non-linear classification models may have better classification performance than linear classifiers. Two new MP methods for generating piecewise-linear discriminant functions are developed in this paper. The first method uses maximisation of classification accuracy (MCA) as the objective, while the second uses an approach based on minimisation of the sum of deviations (MSD). A two-group problem is used to illustrate the use of these new MP models and the results are compared with those from standard MCA and MSD models.

Paper-ID: 809

NONLINEAR PROGRAMMING PROBLEM WITH FRACTIONAL OBJECTIVE FUNCTION AND SENSITIVITY ANALYSIS

CILEG Marija
KIS Tibor
Faculty of Economics Serbia and Montenegro

KIS Andor
Faculty of Economics in Subotica Serbia and Montenegro

Contributed paper

Keywords: Capacity Planning, Mathematical Programming, Production and Inventory Systems

This paper deals with the sensitivity analysis of hyperbolic programming models. At first, we propose a method to investigate the possible changes in the objective function and in capacity vector, while the nonlinear form is used in model solving. Besides that, we analyze restrictions to the linear form as that are necessary to make it possible to perform sensitivity analysis in practice. Numerical illustrations are provided for both cases. Examples deal with product choice under conditions of limited capacities and market limits, while the objective function contains data on income and costs.

MA13, 9:00 – 10:30 Executive Room Gamma
Computational Methods in Transportation and Logistics (O35)

Chair: Christos Tarantilis

Paper-ID: 1408

Active Guided Evolution Strategies for Large Scale Vehicle Routing Problem

BRAYSY Olli
SINTEF ICT Norway

MESTER David
University of Haifa Israel

Paper in an organized session

Keywords: Location, Metaheuristics, Routing

We present new and effective metaheuristic algorithm, Active Guided Evolution Strategies, for the Capacitated Vehicle Routing Problem. The described algorithm combines the strengths of Guided Local Search (Voudouris, 1997) and Evolution Strategies (Rechenberg, 1973) into an iterative two-stage procedure. The computational experiments were carried out on the 14 standard benchmark problems of Christofides et al. (1979) and 20 large scale instances of Golden et al. (1998). The results demonstrate that the suggested method is highly competitive, providing best-know solutions to all problems except one within reasonable CPU times. The average deviation from the best-known solutions is about 0.01%.

Paper-ID: 1585

An approach combining two methods for the vehicle routing problem with time windows

HOMBERGER Jürg
University of Cooperative Education Germany

GEHRING Hermann
KOCH Michael
FernUni-hagen Germany

Paper in an organized session

Keywords: Metaheuristics, Routing, Transportation and Logistics

The subject of this paper is an approach, which combines two previously methods for the vehicle routing problem with time windows. At first, several initial solutions are

generated using a fast construction heuristic, the multi-start local search heuristic proposed by BR_YSY ET AL. The best of the initial solutions is than optimized by applying the two-phase hybrid metaheuristic proposed by HOMBERGER AND GEHRING. This strategy was applied to the 356 test instances published by SOLOMON and by HOMBERGER. Six solutions were obtained improving the best known solutions with respect to the total travelling distance and the number of routes.

Paper-ID: 1624

Heuristics for Trip Aggregation in Vehicle Routing Applications

VIGO Daniele
MONACI Michele
University of Bologna Italy

Paper in an organized session

Keywords: Routing, Transportation and Logistics

In several routing applications vehicles may perform more than one trip during a given working day. In this paper we consider a generalization of the classical Vechicle Routing Problem where the objective is to determine the daily assignment for each vehicle, possibly made up by more than one trip, so that all customer are served and the overall fixed and variable costs are minimized. We propose fast heuristics algorithm for the studied problem and test them on real-world instances showing that they are effective in the reduction of the overall number of vehicles used and costs.

Paper-ID: 1567

Vehicle Routing for the Home Delivery of Perishable Products

GENDREAU Michel
AZI Nabila
POTVIN Jean-Yves
Université de Montréal Canada

Paper in an organized session

Keywords: Transportation and Logistics

We present an exact algorithm for a variant of the standard vehicle routing problem where a single vehicle is assigned to several routes during a given planning period. This problem is encountered in the home delivery of perishable goods, for which routes must be of short duration and need be combined to form a complete working day. Our problem-solving approach is divided into two phases: all feasible routes are first identified; then, we create a working day for the vehicle, by combining the feasible routes generated previously. Computational results on problem instances derived from Solomon's benchmark problems will be presented.

MA14, 9:00 – 10:30 **Executive Room Delta**

Fuzzy Sets and Systems (C37)

Chair: FORTEMPS Philippe

Paper-ID: 829

Optimizing the confidentiality level in unicast transmission: a fuzzy-based approach

FORTEMPS Philippe
Faculty of Engineering, Mons, Belgium Belgium

Contributed paper

Keywords: Fuzzy Sets and Systems, Multi-Objective Decision Making, OR and the Internet

In this paper, we present a new problematic consisting in the optimization of a communication routing with respect to the confidentiality degree associated to each element within the communication network. This paradigm is becoming more important in the current contexts of network transmission. While reliability is naturally represented by probabilities, confidentiality is to be described by necessity degrees: a link will be confidential when the transmission has no possibility to be divulged. The routing optimisation wrt confidentiality is a bottleneck-variant of the shortest path problem, characterized by specific difficulties related to multi-objective issues. Refinements and tesolution techniques will be sketched.

Paper-ID: 192

Fuzzy-based Models for Urbanization Problems

KOSHLAI Ludmilla
Institute of Cybernetics

MIKHALEVICH Mikhail
Ukrainian Academy of Foreign Trade

Contributed paper

Keywords: Analytic Hierarchy Process, Complex Societal Problems, Multi-Criteria Decision Aids

The paper presents the system of fuzzy sets models aimed to handle one of the complex societal problems, namely, the problem of the development relations between large cities and suburbs. Handling this problem, weakly formalized factors must be taken into account. Two important issues concerning "city-suburbs" relations are considered: 1) the establishment of borders for urbanized area; 2) the search of legislation alternatives to determine financial and administrative relations between municipal structures. The multicriteria generalization of the "gravity" model and hierarchical procedures of complex alternative analysis are proposed. An example will illustrate the results from a practical point of view.

Paper-ID: 634

The goal programming in the fuzzy regression: Decreasing the spreads of the coefficients in the model.

KESKIN Fersin
Turkey

BASARAN Alper
Hacettepe University Turkey

Contributed paper

Keywords: Fuzzy Sets and Systems, Mathematical Programming, Programming, Linear

The objective of this paper is to apply the goal programming (GP) procedure to the fuzzy regression as a solution procedure. The left sides of the inequality constraints are built to include the output responses; this gives us much fuzzier estimations. However, in the GP, all constraints are transformed into equal constraints using the deviational variables. Therefore, there are two objectives. One is to maximize the total of overachievement in lower limits, and the other is to minimize the total of underachievement in upper limits. The proposed approach has been applied to Tanaka's original problem.

Paper-ID: 1502

Generation of strict preference relations from fuzzy orderings

LLAMAZARES Bonifacio
Universidad de Valladolid Spain

DE BAETS Bernard
Ghent University Belgium

Contributed paper

Keywords: Fuzzy Sets and Systems

In this paper we obtain and characterize some fuzzy strict preference relations from fuzzy partial orders. The definition of these orders is based on an equivalente relation and, in the paper, we consider that the indifference relation plays this role. Moreover, we analyze the transitivity of the fuzzy strict preference relations obtained.

MA15, 9:00 – 10:30 VIP Lounge
Dynamic Programming (C71)

Chair: SNIEDOVICH Moshe

Paper-ID: 321

Dijkstra's Algorithm revisited: an OR perspective

SNIEDOVICH Moshe
The University of Melbourne Australia

Contributed paper

Keywords: Programming, Dynamic

Dijkstra's algorithm is one of the most popular algorithms in computer science and operations research. Unfortunately, however, because of historical reasons, a number of

important aspects of this fascinating algorithm are not as transparent to the average user as they should be. One of the unfortunate consequences of this is that this algorithm is generally regarded as a computer science method rather than an operations research method. In this paper we attempt to fix this state of affairs by providing a dynamic programming perspective on the algorithm.

Paper-ID: 323

An optimal employment problem with multiple-choice and partial-recall

TAMAKI mitsushi
Japan

Contributed paper

Keywords: Programming, Dynamic, Stochastic Models

Imagine a situation where a company wants to employ m workers through the coming n periods and a large number of persons apply for this. These applicants are rankable and appear in random order over the periods. When the applicant is chosen, the company earns a profit depending on the rank of the applicant. The problem of the company is to determine, at the end of each period, how many topmost applicants to choose from among those that have arrived in that period based on their ranks relative to all their predecessors in order to maximize the expected total profit.

Paper-ID: 813

Sequential Decision Problems with Incomplete Information and the Sequential Investment Problem

NAKAI Toru
Kyushu University Japan

Contributed paper

Keywords: Programming, Dynamic, Stochastic Models

The total positivity of order two is a fundamental property to investigate the sequential decision problem, and it also plays an important role in the Bayesian learning procedure for a partially observable Markov process. All informations about the unobservable state are summarized by the probability distributions on the state space, and we employ the Bayes' theorem as a learning procedure. We will start to introduce an inequality among random variables and analyze the properties under several assumptions. A job search in a dynamic economy will be considered as an application, and, finally, we will treat a sequential investment problem.

Paper-ID: 1100

Optimizing the performance value of computers with deteriorating components

RACHANIOTIS Nikolaos
PAPPIS Kostas
TSOULFAS Giannis
University of Piraeus Greece

NDERFURTH Karl
Otto-von-Guericke University of Magdeburg Germany

Contributed paper

Keywords: Programming, Dynamic, Reverse Logistics / Remanufacturing, Scheduling

Computer components deteriorate at different rates, which may be calculated by applying appropriate modelling tools. A system is defined for re-assembling different computers from used and new parts. Specific policies may be set up with regards to the needs for upgrading (no permanent components damage), replacement (permanent components damage) and purchasing of new components. The objective is to find the proper re-assembly policies so as to maximize the sum of computers' performance values, under the constraint of a limited budget. A stochastic dynamic programming approach is proposed in order to tackle this problem, and a case study is presented.

MA16, 9:00 – 10:30 **Syndicate Room A**

Environment Management Natural Resources (C20b)

Chair: LOKKAS Philotheos

Paper-ID: 1210

Human Impact on Health and Environmental Water Sustainability

LOKKAS Philotheos
PAPAPOLYMEROU George
TEI of Larissa Greece

Contributed paper

Keywords: Engineering Management, Environmental Management, Health Care

The lack of appreciation, concern and understanding of the causes of environmental pollution created many problems for both the developed and developing countries. International discussions, aiming at preventing the earlier mistakes, being repeated throughout the rest of the world, resulted in the concept of sustainable development, which mainly implies: -concern for social equity -recognition from technology and social organizations that the ability of the environment to meet present and future demands is limited. Although decisions may eventually be taken on political or philosophical grounds, effective methods along with the available engineering and scientific information may assist the decision-makers.

Paper-ID: 181

A CONTROLLED MULTIOBJECTIVE METHODOLOGY FOR PROJECT PRIORITAZION FOR DEFINING A WATERSHED INTERVENTION PLAN

SMITH Ricardo
JARAMILLO Gloria Patricia
VELEZ Jaime Ignacio
Universidad Nacional de Colombia Colombia

Contributed paper

Keywords: Environmental Management, Strategic Planning and Management, Sustainable Development

A controlled multiobjective methodology is proposed to define project ordering in a watershed intervention plan that tries to overcome previous multiobjective procedures

where politicians have the possibility of results manipulation. The proposed procedure defines five priorities groups and the available projects are previously classified in each group. The projects in a higher level group have a higher priority level that the projects of a lower level group. The projects in each group are then ordered using a multiobjective methodology considering a set of objectives proper of each group. An example is presented for a complex urban watershed in Colombia.

Paper ID: 1683

A Multicriteria Facility Location Model for Municipal Solid Waste Management

KARAGIANNIDIS Avraam
Aristotle University of Thessaloniki, Greece

ERKUT Erhan
School of Business, University of Alberta, Canada

PARDALI Sara
PERKOULIDIS George
Aristotle University Thessaloniki

TJANDRA Stevanus
School of Business, University of Alberta, Canada

Contributed Paper

Keywords: Environmental Management, Location, Multi-Objective Decision Making

The paper presents a new multi-criterial mixed-integer linear programming model to solve the location-allocation problem of municipal solid waste management facilities at the regional level. An interactive trade-off method is applied to obtain the DM's best compromise locations and corresponding adopted technologies for transfer stations, material recovery facilities, incinerators, and sanitary landfills and waste flow distributions among those locations. Implementations of the model are given to the case of various areas in North Greece.

MA18, 9:00 – 10:30 Jupiter Lobby
Discussion Presentations I

Paper-ID: 8, MA18, 09:00-09:30, Panel #1

Searching for Semi-strong Form Information Inefficiency in Betting Markets-Implications for Internet Betting

SUNG Ming-Chien
JOHNSON Johnnie
University of Southampton United Kingdom

Discussion presentation paper

Keywords: Financial Modelling, Forecasting, OR in Sports

A review of the literature regarding semi-strong-form efficiency in racetrack-betting markets suggests that bettors may be able to incorporate a single rather than a range of variables simultaneously into their decision-making. Consequently, models are developed to investigate the extent to which the UK racetrack-betting market is

efficient with respect to a comprehensive set of publicly available information by employing both parametric and non-parametric techniques. The models demonstrate that the market is semi-strong-form inefficient. The implications of these findings for internet-betting are explored and it is concluded that the conditions prevailing in these markets may help them to become semi-strong-form efficient.

Paper-ID: 627, MA18, 09:00-09:30, Panel #10

(n,sigma)-games

DE SCHUYMER Bart
DE MEYER Hans
DE BAETS Bernard
Ghent University Belgium

Discussion presentation paper

Keywords: Game Theory

By combining two random events in which an integer is drawn from a multiset of integers, three variants of a symmetric game, called (n,sigma)-game, are defined. In these games, the multisets contain n integers summing up to sigma, and they constitute the strategies of the game. The game variants are distinguished by the way the two random events are coupled, using the well-known concept of a copula. For each game variant, the necessary and sufficient conditions are established for a strategy to be optimal. Furthermore, some interesting results about particular .diophantine equations are formulated.

Paper-ID: 901, MA18, 09:00-09:30 Panel #19

The open vehicle routing problem with time windows

REPOUSSIS Panagiotis
TARANTILIS Christos
Athens University of Economics and Business Greece

IOANNOU George
PRASTACOS Gregory
Athens University of Economics and Business Greece

Discussion presentation paper

Keywords: Routing, Search Algorithms, Transportation and Logistics

In this paper we consider the problem of the open vehicle routing problem with time windows constraints (OVRPTW). The OVRPTW is a variant of the classical VRPTW, in which the vehicles do not return to the distribution depot after delivering the goods to the customers or, if they do so, they must visit the same customers, for the collection of goods, in the reverse order. Our solution method is employing a greedy look-ahead heuristic, which utilizes time windows related information via composite customer selection and route insertion criteria.

Paper-ID: 1154, MA18, 09:00-09:30, Panel #28

A Genetic Algorithm for Facility Layout

KULLUK Sinem
Turkey

Discussion presentation paper

Keywords: Facilities Planning and Design, Metaheuristics

Facility layout is an important aspect of designing any manufacturing system. However, the problem of finding optimal layouts is hard and deterministic techniques are not computationally feasible. In this study, a GA based algorithm is presented for solving the single-floor facility layout problem and equal sized departments are considered. The GAs performance is evaluated using several test problems available in the literature.

Paper-ID: 1440, MA18, 09:00-09:30, Panel #37

Applying Computer-based Patient Record (CPR) in the health information management

KHAJOUEI reza
AHMADIAN leila
kerman medical sciences university Iran, Islamic Republic Of

Discussion presentation paper

Keywords: Health Care, Information Retrieval – filtering, Management Information Systems

Providing comprehensive, coordinated, and longitudinal patient care require the collection and analysis of complex clinical information that performs through the medical records. Paper medical record (PMR) isn’t efficient in this case and requires a lot of space, equipment and personnel. Therefore computer-based patient record (CPR) established. This article first offers a background of CPR, then the current level of CPR penetration throughout the health care delivery system describes. Barriers exist in the creation and transmission to CPR discus. Finally the role of the health information management professionals in installation and utilization of the CPR describes.

Paper-ID: 630, MA18, 09:30-10:00, Panel #11

INNOVATION, FIRM SIZE AND PATENTS: AN EMPIRICAL STUDY FROM SPANISH FIRMS

PEREZ-CANO Carmen
Universidad Polittecnica de Madrid

Discussion presentation paper

Keywords: Innovation, Knowledge Engineering and Management, Technology Management

This work aims to deepen in the knowledge of the variables concerning the innovative effort developed by firms. Firstly, we test the schumpeterian hypothesis that support the existence of a positive relationship between firm size and the willingness to invest in R&D. Then, we support the idea that this incentive depends upon the firm possibilities to protect its innovative results in an effective way (current expectations on future returns). The unit of analysis we have used in this work is the innovation. The sample is integrated by 2030 Spanish manufacturing firms among which we have got information about 670 innovations.

Paper-ID: 50, MA18, 09:30-10:00, Panel #2

The Supply Chain History of Park n' Shop in Hong Kong

CHAN Yanchong
City University of Hong Kong

Discussion presentation paper

Keywords: Airline Applications

In 1996, Park 'n Shop, thelargest superamarket group in Hong Kong decide to penetrate into wet market business. The new strategies need to be supported by upgrading the use of information technology, computer forecasting, just in time delivery, cross docking system, and apply the vendor manage inventory system to improve suppliers partnerships. The company opened 40 big new supperstresin 5 years.The sale turnover increase 200%, range of stock keepping units increaed 500%. But the total invenory level reduced, out of stoct situations decreased, and the company needed not require any larger warehouse for growing business.

Paper-ID: 921, MA18, 09:30-10:00, Panel #20

E-CUSTOMER AND E-MARKETING: A SURVEY IN GREEK COMPANIES

AGGELOPOULOS Spyros
Techinical University of Crete Greece

ATSALAKIS George
Greece

SKIADAS Christos
Technical University of Crete Greece

Discussion presentation paper

Keywords: Marketing

The customer is the ascendant and he defines the rules of the market. The thoughts of marketing must be orientated in the new electronic world who leads at the creation of e-marketing. In this paper are presented the differences between the traditional way of thinking in marketing and the way of thinking in internet marketing. Also the individualities of e-customer, which create these changes, are presented and analyzed. Finally, the results of a survey that took place among the companies listed at Athens Stock Exchange are presented and discussed. It describes the current situation in Greek companies.

Paper-ID: 1179, MA-18, 09:30-10:00, Panel #29

Modeling of risks and threats using scoring functions

KOUCKA Ivona
Czech Republic

JABLONSKY Josef
University of Economics Prague Czech Republic

Discussion presentation paper

Keywords: Financial Modelling, Programming, Nonlinear

Credit scoring and behavioral scoring are the techniques that help organizations decide whether or not to grant credit to consumers. The paper presents possible ways of optimization of the transformation of explanatory variables in scoring functions in order

to achieve their best resolution ability, to enable the creation of scorecards and to ensure the stability of results. The transformations of variables should respect the mutual dependencies of explanatory variables. The paper also tries to suggest how to handle the other dependencies than linear. The scoring function will be developed and checked by validation tests on real data sets.

Paper-ID: 1441, MA-18, 09:30-10:00, Panel #38

A Study on Neurologists and Coders: Viewpoints about the ICD-10 and ICD-NA Classification in 2003

KHAJOUEI reza
AHMADIAN leila
kerman medical sciences university Iran, Islamic Republic Of

Discussion presentation paper

Keywords: Health Care, Information Retrieval - filtering

Objective: This research find out neurologists’ and coders’ viewpoints about the ICD-10 and ICD-NA. Method: This descriptive research has done cross-sectionally. Data Collection was done through two questionnaires. Results: 41.86% of the neurologists had little acquaintance with ICD-10 and ICD-NA and all believed in classification necessity. 74.42% selected the instruction of ICD-NA as “necessary” and “very necessary”. Coders believed that the classification based on ICD-10 is positively necessary. 66.67% of them had little familiarity with ICD-NA, but believed that using ICD-NA is very important. Conclusion: ICD-NA is necessary for classification of neurological diseases and future research in this field.

Paper-ID: 251, MA-18, 10:00-10:30, Panel #12

A Genetic Algorithm for A Cell Formation Problem with Multiple Objectives

JEONG Byung-Ho
Korea, Republic Of

UNSU Lee
Chonbuk National University Korea, Republic Of

Discussion presentation paper

Keywords: Facilities Planning and Design, Metaheuristics

This paper deals with a cell formation problem for a set of m-MC and n-parts. The paper considers multiple objectives; minimize number of intercell movements, minimize intracell & intercell workload variation. Generally, a cell formation problem is known as NP-completeness. We propose a multiple objective Genetic Algorithms(MOGA) resolving the three objective cell formation problem. The MOGA procedure uses Pareto optimal concept for a selection method and the concept of Euclidean distance from the ideal and negative ideal solution for fitness test of a individual. A numerical example is given for a comparative analysis with the results of other research.

Parallel Sessions

Monday, July 5

MC02, 14:00 – 15:30 **Delphi Amphitheater**
Scheduling: Flow shop II (C81b)

Chair: STRUSEVICH Vitaly

Paper-ID: 685
Flow Shop Scheduling with No-Wait Jobs

STRUSEVICH Vitaly
University of Greenwich United Kingdom

KUBZIN Mikhail
University of Greenwich United Kingdom

BILLAUT Jean-Charles
BOUQUARD Jean-Lois
University of Tours France

Contributed paper

Keywords: Complexity and Approximation, Scheduling

We provide a fairly complete complexity classification of various versions of the two-machine permutation flow shop scheduling problem to minimize the makespan in which some of the jobs have to be processed with no-wait in process. We show that the general problem is NP-hard in the strong sense, and is polynomially solvable if the number of the regular jobs is fixed. The problem with a fixed number of the no-wait jobs is shown to be binary NP-hard and solvable in pseudo polynomial time. For the latter version we offer a FPTAS and a fast 4/3-approximation algorithm.

Paper-ID: 222
APPLICATION OF A GENETIC LOCAL SEARCH ALGORITHM FOR SEQUENCING PROBLEM ON A SYNCHRONOUS FLOW LINE

SOYLU Banu
Industrial Engineering, METU Turkey

Contributed paper

Keywords: Metaheuristics, Scheduling

GAs have become increasingly popular as a means of solving flowshop sequencing problems. Synchronous line sequencing (SLS) problem is one of sequencing jobs in a synchronous flow line with the objective of minimizing makespan. In this study, we apply two genetic local search (GLS) algorithms, which is a hybrid algorithm of a local search (LS) and a genetic algorithm (GA), to the problem environment. We compare the performance of GLS algorithms with the optimum results which was obtained from a branch&bound algorithm with tight upper&lower bounding procedures. We also compare performance of two GLS algorithms with each other.

Paper-ID: 1362

Integrating preventive maintenance and scheduling in flow shop environments

RUIZ Ruben
GARCIA-DIAZ J. Carlos
MAROTO Concepcion
Universidad Politecnica de Valencia Spain

Contributed paper

Keywords: Flexible Manufacturing Systems, Reliability, Scheduling

We have seen great advances in the field of flowshop scheduling. However, the machines are still many times assumed continuously available. While one can consider stochastic breakdowns in the machines, it is more interesting to study Preventive Maintenance (PM) policies and to implement them in the schedule. In this work we show new metaheuristic algorithms that jointly consider PM and scheduling, two problems that are closely interrelated since the PM actions affect the schedule and vice versa. The results of the algorithms are compared against common practices in industry where PM is considered either before or after the schedule

Paper-ID: 1500

AN ASYNCHRONOUS PARALLEL GENETIC ALGORITHM FOR THE FLOWSHOP SCHEDULING PROBLEM

VALLADA Eva
MAROTO Concepcion
RUIZ Ruben
Universidad Politecnica de Valencia Spain

Contributed paper

Keywords: Scheduling

In this work, we present the parallelization of a Genetic Algorithm (GA) and a Hybrid Genetic Algorithm (HGA) for the flowshop scheduling problem. The structure used to parallelize follows the Island Model where a migration operator is introduced allowing populations on the islands to exchange individuals. The performance of the Parallel Genetic Algorithm (PGA) and the Parallel Hybrid Genetic Algorithm (PHGA) have been evaluated with the 120 problems of Taillard. Test results show that the parallel versions improve the results achieved with the sequential GA and HGA. We also compare the results with some of the most well known metaheuristics.

Parallel Sessions

Monday, July 5

MC03, 14:00 – 15:30 **Athena**

Combinatorial Optimization: Applications of Heuristics (C13)

Chair: JACQUES Teghem

Paper-ID: 1232

New formulation and appication of a hybrid genetic algorithm for the airline crew-pairing problem.

JACQUES Teghem
SOUAI Nadia
Faculté Polytechnique de Mons Belgium

Contributed paper

Keywords: Airline Applications, Combinatorial Optimization, Metaheuristics

Airline crew scheduling problem is an important problem that airline companies must deal with.This problem was often decomposed into two sub problems: - the crew-pairing problem - the crew rostering problem. In this paper we applied a hybrid algorithm which consists in a steady-state genetic algorithm combined with a local search to the airline crew-pairing problem. To solve the problem we used two formulations: - a pairings based formulation; - a duty periods based formulation. These two approaches were tested on real- data provided from an airline company.The results obtained were peromising compared with those used by the company.

Paper-ID: 1074

Some experiments with a simple tabu search algorithm for the manufacturer's pallet loading problem

PUREZA Vitoria
UFSCAR Brazil

MORABITO Reinaldo
Federal University of Sáo Carlos Brazil

Contributed paper

Keywords: Combinatorial Optimization, Cutting and Packing, Metaheuristics

The manufacturers pallet loading problem consists in arranging, orthogonally and without overlapping, the maximum number of identical boxes onto a rectangular pallet. It has been successfully handled by block heuristics, which provide solutions limited to the so-called 1st order non-guillotine patterns. We propose an algorithm based on the incorporation of simple tabu search in block heuristics. From an initial pattern, it performs moves that increase the size of blocks in the current pattern; as a result, other blocks are decreased, eliminated or created. Results indicate the approach generates superior order optimal patterns for difficult instances reported in the literature.

Paper-ID: 1369

Reactive tabu adaptive memory programming search for the vehicle routing problem with back-hauls

WASSAN Niaz
NAGY Gbor
United Kingdom

Contributed paper

Keywords: Metaheuristics, Routing, Transportation and Logistics

The vehicle routing problem with back-hauls (VRPB) involves designing a set of routes that minimises the total cost for a fleet of vehicles. The proposed solution approach is based on a hybrid operation of reactive tabu search (RTS) and adaptive memory programming (AMP). The RTS is used with a new escape mechanism which manipulates different neighbourhood schemes in a sophisticated way to get a balanced intensification and diversification continuously during the search process. The AMP strategy takes the search back to unexplored regions of search space by maintaining a set of elite solutions and using them strategically with the RTS.

Paper-ID: 1378

Combinatorial Optimization for the Selection of Tourism Attractions

GODART Jean-Marc
Faculté polytechnique de Mons Belgium

Contributed paper

Keywords: Decision Support Systems, Metaheuristics, Multi-Objective Decision Making

The multiple objective Trip Planning Problem (TPP) proved to be appropriate to provide decision aid in planning (tourism) trips. Here, it is focused on the selection of the attractions to be visited on a trip. An improved model is suggested in this respect and the assumptions are discussed. Then, a metaheuristic algorithm is proposed to solve the multiple objective combinatorial optimization problem which is underlying this model. Finally, the results are presented.

MC04, 14:00 – 15:30 — Salon des Roses A

EWG MCAD: Environmental issues (O14)

Chair: DIAKOULAKI Danae

Paper-ID: 1465

Electricity Technology and Scenario Ranking within an Integrated Decision-Support Tool

DONES Roberto
HIRSCHBERG Stefan
Paul Scherrer Institut Switzerland

Paper in an organized session

Keywords: Decision Support Systems, Energy Policy and Planning, Multi-Criteria Decision Aids

A tool for communication and exploration of the results of an integrated assessment study on electricity supply options has been developed on DVD. It includes a decision-

support software for the interactive ranking of technologies and scenarios. This software allows combining indicators on environment, risk, health, economy, and society with stakeholders weighting to investigate the robustness of energy policies. The indicators reflect the results of the comprehensive assessments. The multi-disciplinary, multi-methodology, multi-stakeholder, and multi-institution China Energy Technology Program was focused on the Shandong province but the developed methodological framework and tool can be applied elsewhere, subject to suitable adjustments.

Paper-ID: 1412

Exploitation of MCDA in the monetization of non - tradable environmental goods and the assessment of energy plans and policies

GRAFAKOS Stelios
PASTRIKOS Nikos
National Technical University of Athens Greece

MIRASGEDIS Sebastian
National Observatory of Athens Greece

DIAKOULAKI Danae
NTUA Greece

Paper in an organized session

Keywords: Energy Policy and Planning, Multi-Criteria Decision Aids, EWG MCAD Multi-Criteria Aid for Decision

The scope of this paper is to combine Multiple Criteria Decision Aid and Cost Benefit Analysis in order to better exploit their strengths and assist in the evaluation of alternative scenarios for the expansion of the electricity generation system. It has been found that methods based on Multiple Attribute Value Theory are compatible with CBA and can be used to indirectly assign monetary values to environmental impacts that are not monetised so far by valuation methods of welfare economics. The obtained results show that the developed approach provides meaningful results displaying total costs and benefits associated with alternative electricity scenarios.

Paper-ID: 1219

IDEA-AM: the Integrated Development and Environmental Additionality - Assessment Methodology

FLAMOS Alexandros
ANAGNOSTOPOULOS Kostas
National Technical University of Greece

GOLETSIS Yorgos
University of Ioannina Greece

PSARRAS John
National Technical University of Athens Greece

Paper in an organized session

Keywords: Multi-Criteria Decision Aids, Sustainable Development

A project could be considered eligible under the Clean Development Mechanism (CDM) if it fulfills a double additionality condition: (i) an environmental additionality and (ii) a

sustainable development additionality. In this framework, we hereby present the Integrated Development and Environmental Additionality Assessment Methodology (IDEA-AM), a multicriteria based methodology for the assessment of candidate CDM projects additionality and its application to selected cases from the Mediterranean region. IDEA-AM has proven to be a useful assessment tool and can become a useful aid to policy and decision-makers as they strive towards the effective application of CDM.

Paper-ID: 1195

MULTICRITERIA AND MULTIPARTICIPATORY ANALYSIS OF WIND ENERGY PROJECTS IN LESVOS, GREECE

POLATIDIS Heracles
ELEFTHERIADOU Eleni
HARALAMBOPOULOS Dias
University of the Aegean Greece

Paper in an organized session

Keywords: Energy Policy and Planning, Multi-Criteria Decision Aids, Software for OR/MS Analysis

The complexity of (renewable) energy planning renders Multi-Criteria Decision Analysis (MCDA) techniques a useful tool in the decision process. This paper presents a web-based decision-aid toolkit developed for renewable energy applications. A real-case decision-making session regarding the extension of a wind park, the results obtained and the proxy consensus reached during a workshop of regional and European stakeholders held in Mytilene-Lesvos, are also presented. The framework is based on an enhanced PROMETHEE II version. The toolkit is being developed with the support of a grant from the European Commission via an FP5 "Energy and Environment and Sustainable Development"; project.

MC05, 14:00 – 15:30 **Salon des Roses B**

Strategic Planning and Management (C90)

Chair: MEADOWS Maureen

Paper-ID: 510

Vision statements: content and context

MEADOWS Maureen
University of Warwick United Kingdom

Contributed paper

Keywords: Finance and Banking, Service Operations, Strategic Planning and Management

This paper will discuss a project to undertake content analysis on the vision statements of UK organisations from two sectors - financial services and supermarkets. The paper will discuss the methodology of content analysis adopted, the impact of industry sector upon visioning practice, and early results indicating that managers could do more to grasp visioning as a strategic tool.

Paper-ID: 224

The impact of strategic alliances in resolving problems of globalization in medium sized firms: The case of Greece

SAMANTA-ROUNTI Irene
KYRIAZOPOULOS Panagiotis
MAVRIDOGLOU Georgios
Graduate Technological Education of Piraeus Greece

Contributed paper

Keywords: Entrepreneurship, Strategic Planning and Management

Previous research investigating the competitive advantage of medium sized firms have emphasised the importance of strategic alliances as key factors of business survival in the global economy. This paper presents the results of a survey, in 228 firms divided in three main sectors, services, manufacturing, retailing. The survey examines the ability of medium sized firms to operate in a highly competitive environment and how strategic alliances can help them to do so. More specifically analyze the motives, attitudes and conditions underlying entering and maintaining alliance activity as a mean of protecting Greek firms in a global environment.

Paper-ID: 1352

Assessing the elements of strategic/corporate planning: a global survey

TAPINOS Stathis
DYSON Robert
MEADOWS Maureen
University of Warwick United Kingdom

Contributed paper

Keywords: Strategic Planning and Management

This paper presents the results of a global survey, investigating the current trends of strategic/corporate planning. The survey was conducted online with alumni students from Warwick Business School. Using factor analysis, four distinct factors of strategic/corporate planning have been identified. The role of each factor has been evaluated on a series of assessments for strategic/corporate planning. Significant differences are observed in the design and implementation of strategic/corporate planning within different organisational levels, as well as within organisations of different size and operating different in environment.

MC06, 14:00 – 15:30 — Nafsica A

Supply Chain Management II (C93)

Chair: LEBLANC Larry

Paper-ID: 1295

Capacitated Global Supply Chains with Alternative Production Sources

LEBLANC Larry
GALBRETH Michael
HILL James
Vanderbilt University United States

ELLIOTT Ian
Nu-kote International, Inc. United States

Contributed paper

Keywords: Programming, Linear, Supply Chain Management, Transportation and Logistics

Nu-kote International, Inc., re-manufactures cartridges for printers, copiers and fax machines. Cartridges are re-manufactured in the U.S., China, and Thailand. We describe a spreadsheet LP model for Nu-kote's supply chain. This model minimizes the overall cost for procurement, re-manufacture, and distribution of cartridges over a multi-period time horizon. We show how we reduced the number of variables by eliminating infeasible combinations, limiting advance procurement, and aggregating time periods. Development shortcuts included the use of advanced filters, VBA procedures, and limiting the size of the range containing changing cells (number of dis-contiguous ranges). We report these development challenges and computational results.

Paper-ID: 1485

Supply chain coordinations

FIALA Petr
University of Economics Czech Republic

Contributed paper

Keywords: Game Theory, Production and Inventory Systems, Supply Chain Management

Supply chain is a decentralized system where material, financial, information and decision flows connect members. Double marginalization is a well-known cause of supply chain inefficiency and the problem occurs whenever the supply chain's profits are divided among two or more members and at least one of the members influences demand. Supply chain contract is a coordination mechanism that provides incentives to all of its members so that the decentralized supply chain behaves as the integrated one. The aim of this paper is to analyze and to compare different types of contracts and to seek for solving of generalized problems.

Paper-ID: 779

OR techniques for supply chain synchronization

ZUIDWIJK Rob
VAN DER LAAN Erwin
Erasmus University Rotterdam Netherlands

Contributed paper

Keywords: Supply Chain Management

Supply Chain Synchronization coordinates the retail supply chain and reduces handling and chain inventory. Implementing the logistics concept requires balancing costs and benefits among the supply chain partners. In a large project with suppliers and retailers, these issues have been explored. In this contribution we consider three aspects: (i) timing of cash flows (ii) incentive alignment within and between organizations (iii) negotiation process. In particular, we explore the possibility to develop OR techniques to support decision making in this context.

Paper-ID: 1344

Inventory Optimisation in a Supply Chain - The Differences Between Using Analytical and Simulation Tools

KUNCOVA Martina
Czech Republic

Contributed paper

Keywords: Simulation, Supply Chain Management

Inventory optimisation in a supply chain is a complex problem that has been examined in a variety of ways. This study investigates the possibilities of using analytical methods of inventory optimisation and their suitable interconnection with the simulation methods. Considering a supply chain that consists of a manufacturer and a retailer it is shown how differs the local optimum from the global one in cases of no information, part and full information about the consumer's demand. A simple way of using simulation methods for an order determination is presented.

MC07, 14:00 – 15:30 — Nefeli B

Data Envelopment Analysis II (C17)

Chair: JABLONSKY Josef

Paper-ID: 1394

Super-efficiency DEA models and their comparison: An application to the evaluation of productivity of Central European firms

JABLONSKY Josef
University of Economics Prague Czech Republic

Contributed paper

Keywords: Data Envelopment Analysis, Economic Modeling, Multi-Criteria Decision Aids

The paper proposes an original definition of super-efficiency in DEA models. The definition works directly with positive slacks of inputs and negative slacks of outputs. The results of several test examples are compared with other super-efficiency models. The paper contains a case study that consists in analysis of productivity gap between highly developed European economies and several Central European countries accessing the EU. The study is based on a real data set obtained by the interview of Central European firms coming from four important industry branches. All the DEA models are solved by means of the original MS Excel application.

Paper-ID: 503

Balanced Scorecard Based on Interactive Benchmarking

NIELSEN Kurt
The Royal Agricultural University, Copenhagen

Contributed paper

Keywords: Data Envelopment Analysis, Multi-Criteria Decision Aids, Web-based information systems

We suggest a new way of performing Individual Interactive Benchmarking, which complement the idea of Balanced Scorecard. A number of partial benchmarking models

describe the firm's performance. Each model is tailored to the individual user by letting him decide on the set of potential peers and the direction in which to improve. The user interactively changes his preferences and receives benchmarks, the peers that represent the benchmark and improvement potentials. The interactive search within and between the benchmarking models helps the user to determine corporate direction and provides information about cause and effect on inputs and outputs when changing direction.

Paper-ID: 803

The Diffusion of Research on Productive Efficiency

SARAFOGLOU Nikias
Mid Sweden University

FORSUND Finn R
University of Oslo Norway

Contributed paper

Keywords: Data Envelopment Analysis, Economic Modeling, Programming, Linear

The field of theoretical and applied efficiency analysis is pursued both by economists and people from OR/MS. Each group tends to cite a different paper as seminal one. Recent availability of electronically accesible databases of the journal articles makes the study of the diffusion of papers through citations possible. The conventional wisdom that the seminal paper within economics lay dormant for two decades, and the efficiency studies only got rolling after the OR paper appeared, is shown to be wrong.

Paper-ID: 1456

Efficiency measurement of electricity distribution companies

BJORNDAL Endre
BJORNDAL Mette
Norwegian School of Economics and Business Administration, NHH Norway

Contributed paper

Keywords: Data Envelopment Analysis, Energy Policy and Planning

In this paper we study efficiency measurement as part of the regulation scheme for the Norwegian electricity sector. In the low-voltage distribution companies it is reasonable that part of the cost-base is customer driven, and hence can be separated from the other costs of the companies. We investigate the consequences for the information provided to the regulator and the regulated utilities, of using a non-parametric efficiency measurement model, such as DEA, in such a production environment.

MC08, 14:00 – 15:30 **Nafsica B**
Cutting & Packing II (O04b)

Chair: OLIVEIRA Jose Fernando

Paper-ID: 1105
A computational evaluation of Wang's algorithm and its variants for the 2D constrained rectangular cutting problem

OLIVEIRA Jose Fernando
FEUP / INESC Porto Portugal

Paper in an organized session

Keywords: Cutting and Packing

Published in 1983, Wang's algorithm for the 2D constrained rectangular cutting problem still is a reference for the resolution of this type of problems. During the last 20 years several authors published variants and improvements to this algorithm. In this talk we will present a computational experiment where Wang's algorithm and its variants will be tested and evaluated in modern computers and with much more difficult problem instances, so that their limitations with nowadays technology may be known and their applicability to large real-world problems analysed.

Paper-ID: 827
A tabu search algorithm for the pallet loading problem

ALVAREZ-VALDES Ramon
University of Valencia Spain

PARRENO Francisco
University of Castilla-La Mancha Spain

TAMARIT Jose
University of Valencia Spain

Paper in an organized session

Keywords: Cutting and Packing, Metaheuristics

This paper presents a new heuristic algorithm for the pallet loading problem, the problem of packing the maximum number of identical rectangular boxes onto a rectangular pallet. The problem arises in distribution and logistics and has many practical applications. We have developed a tabu search algorithm based on new types of moves. Instead of moving individual boxes, we propose moving blocks, sets of boxes with the same orientation. We have tested our algorithm on the whole sets Cover I and Cover II, usually taken as a reference for this problem, and we obtain excellent results in very short computing times.

Paper-ID: 1046
Swap versus insert movements in neighbourhoods: a computational study for the Nesting Problem

GOMES A. Miguel
OLIVEIRA Jose Fernando
FEUP / INESC Porto Portugal

Paper in an organized session

Keywords: Combinatorial Optimization, Cutting and Packing, Metaheuristics

Two of the most popular types of movements for searching neighbourhoods in any local search algorithm are the swap of two elements and the insertion of one element. Several works have been published using swap or insert movements in local search algorithms for Nesting Problems. However, in these works, these type of movements are rarely used together in a coordinated way. We present a computational study where these types of movements are evaluated.

Paper-ID: 545

3D Packing based on Less flexibility first principle

ZHOU Zhe
DONG Sheqin
HONG Xianlong
Tsinghua University, Beijing, China China

WU Yu-Liang
The Chinese University of Hong Kong, Hong Kong Hong Kong

Contributed paper

Keywords: Capacity Planning, Cutting and Packing, Transportation and Logistics

The 3D packing problem is packing a list of boxes of various sizes which can be rotated and placed by any orientation into one container to maximize the volume utilization of the container. In this paper, an extension to the effective deterministic heuristic, Less Flexibility First, first proposed by Yuliang Wu to solve 2D packing problem, was introduced to solve this problem. Also, we propose some improved algorithms. All cases from the OR-Library were tested and experiment results demonstrate the algorithms are effective and promising.

MC09, 14:00 – 15:30 **Jupiter (small)**

Financial Engineering I (O02)

Chair: ZOPOUNIDIS Constantin

Paper-ID: 600

AN INTEREST RATE ASSET LIABILITY MANAGEMENT MODEL FOR BANKS

KOSMIDOU Kyriaki
ZOPOUNIDIS Constantin
Technical University of Crete Greece

Paper in an organized session

Keywords: Finance and Banking, Financial Engineering, Mathematical Programming

The interest rate uncertainty that prevails at the financial environment has encouraged banks to optimize the efficiency in the management of their assets and liabilities. In managing its assets and liabilities, a bank should face several conflicting goals, such as the maximization of returns, the minimization of risk, the maintenance of a desirable level of liquidity and solvency, the expansion of deposits and loans. In this paper, we

develop an asset liability management methodology and test interest rate scenario generation through a simulation analysis to determine the optimal balance of large commercial bank's assets and liabilities.

Paper-ID: 1189

Forecasting Hedge Fund Index Returns by Level and Classification: A Comparative Analysis of Neural Network Topologies

DASH Gordon
KAJIJI Nina
University of Rhode Island United States

Paper in an organized session

Keywords: Artificial Intelligence, ES and Neural Networks, Financial Engineering, Forecasting

Stylized facts do not present a consensus regarding the predictability of returns for investment hedge funds. Recent findings report that classification prediction dominates return-level prediction methodology when returns are skewed and leptokurtic. This paper examines modeling and out-of-sample return prediction efficiency across three radial basis function (RBF) artificial neural networks (ANN) when applied to the thirteen Credit Swiss First Boston/Tremont hedge fund indices. The results provide evidence that the Kajiji-5 RBF ANN dominates the RBF topology in the modeling of hedge fund returns by both level and classification. Additionally, the Kajiji-5 is capable of near perfect one-period ahead directional prediction.

Paper-ID: 551

Proposed Methodology for Factors' Hierarcy with the use of Correspondence Analysis

FLOROPOULOS Iordanis
Greece

MOSCHIDIS Odysseus
University of Macedonia Greece

Paper in an organized session

Keywords: Financial Engineering

The significance of a methodology for criteria (factors) classification which define or heavily influence a certain subject is self evident. Such methodology gains even greater value, when at the same time it gives us the opportunity to compare the factors classification in more than one subject areas of influence. This methodology which is based on the results of the equivalence factor analysis (Lebart, Morineau and Piron, 2002) is presented and explained through a particular application which classifies 18 factors (criteria) that influenced the order of preference of 318 male and 454 female students in their choice of university departments.

MC10, 14:00 – 15:30 Nefeli A

Health Care and Mathematical Diagnostics (O16)

Chair: PATRIZI Giacomo

Paper-ID: 1215

The determination of protein folds: precise classification and statistical analysis

CIFARELLI Claudio
Italy

PATRIZI Giacomo
University of Rome "La Sapienza" Italy

Paper in an organized session

Keywords: Bioinformatics, Health Care

From an mino acid chain, it is important to determine where the folds occur and how the amino acids are positioned with respect to each other and to the protein structure. Folding determines the characteristics of the protein. Thus it is possible to determine its properties by finding where the folds occur. Experimental results will be given regarding the prediction of the protein secondary structure, given its primary structure (the sequence of mino acids). A precise classification algorithm and appropriate sampling procedures will be presented, so as to guarantee that the experimental results can be generalised to the whole population.

Paper-ID: 1505

Application of the Logic Data Miner Lsquare to the diagnosis of hepatocellular carcinoma

FELICI Giovanni
Consiglio Nazionale delle Ricerche Italy

TRUEMPER Klaus
University of Texas at Dallas United States

DI GIACOMO Paola
La Sapienza University of Rome Italy

Paper in an organized session

Keywords: Artificial Intelligence, ES and Neural Networks, Data Mining and Data Base Modeling, Health Care

In this presentation we discuss the application of the Logic Data Miner Lsquare to medical diagnosis problems. This tool operates in the logic domain and presents several interesting features for the development of medical diagnostic systems. The talk covers the main methodological issues related with the solution of learning problems in logic, their modeling as Minimum Cost Satisfiabilty problems and the logic programming engine adopted for their solution. We will then consider its application to produce interpretations and separation formulas for a medical database related with hepatocellular carcinoma, one of the most widely spread malignant tumors in the world.

Paper-ID: 1576
Dynamical diagnosis in Medicine
PATRIZI Giacomo
University of Rome "La Sapienza" Italy

Paper in an organized session

Keywords: Artificial Intelligence, ES and Neural Networks, Health Care, Medical Applications

Classification algorithms can be formulated that are precise, syntactically correct and semantically adequate, to determine pathological states and to evaluate progress made, through time as a result of treatment. The aim of this paper is to present the algorithm used in diagnosis which has given precise results and extend it to monitoring treatment progress dynamically. Various pathologies will be examined as well as diagnoses usually considered hard and these results willbe compared to other classification procedures. In all cases accurate diagnosis can be formulated and new aspects of the pathology or intervention can be determined.

MC11, 14:00 – 15:30 — Executive Room Alpha
Timetabling I (O34)

Chair: DASKALAKI Sophia

Paper-ID: 1521
Course Timetabling in a Competitive Scenario
CARVAJAL-SCHIAFFINO Ruben
ITC-irst

Paper in an organized session

Keywords: Timetabling, EWG WATT Working Group on Automated Time Tabling

The generation of course timetables for educational institutions is a hard problem that must be faced by the managers of these institutions. The problem becomes important when a good course timetable represents a quality element that allow to show a difference in comparison with similar educational programs offered by other institutions. Our goal is to generate solutions considering qualitative aspects. A way to have all the possible solutions considering the lecturers time availability is to use the graph colouring approach, where the graph is modelled as a Petri net. The possible solutions will be generated with its reachability set.

Paper-ID: 1529
Using Integer Programming and Column Generation for the Solution of the Greek Universities Timetabling Problem
PAPOUTSIS Kostas
Greece

HOUSOS Efthymios
VALOUXIS Christos
University of Patras Greece

Paper in an organized session

Keywords: Programming, Integer, Timetabling, EWG WATT Working Group on Automated Time Tabling

In this paper, a typical Greek Universities timetabling problem is modelled and solved. For the modelling of this problem a 0-1 IP model is used. Each variable of this model corresponds to a fully dated weekly schedule of a group of students. The model is solved in two consecutive computational phases. The first phase assigns all the activities to the days of the week and it is solved using column generation. The second phase assigns the actual time-slots for each activity. This approach was successfully used for four semesters for the lecture timetable construction of a Greek University Department.

Paper-ID: 1213

Timetabling Problem in Persian Universities

NAJI AZIMI Zahra
ferdowsi university Iran, Islamic Republic Of

Contributed paper

Keywords: Metaheuristics, Scheduling, Timetabling

The construction of an Exam timetable is a common problem for all universities and institutions of higher education. In this paper we use methaheuristics for solving Timetabling problem in Persian universities.

Paper-ID: 1519

Quality quantification for educational timetables

DASKALAKI Sophia
BIRBAS Theodore
University of Patras Greece

Paper in an organized session

Keywords: Mathematical Programming, Timetabling, EWG WATT Working Group on Automated Time Tabling

Using 0-1 integer programming the timetabling problem has been modeled successfully for all levels of the Hellenic educational system. While this is a major step for the optimization process in this domain, quantifying the quality of the resulting timetables still remains an interesting problem. In this paper we give the quality criteria which are important for our problem and provide a systematic way of defining the cost coefficients in the objective function of our model in order to further improve the level of satisfaction that a timetable may provide for its users.

Parallel Sessions

Monday, July 5

MC12, 14:00 – 15:30 **Executive Room Beta**
Mathematical Programming II (C53)

Chair: HUHN Petra

Paper-ID: 896

Average Complexity of Interior Point Methods: the total expected number of steps

HUHN Petra
Technical University Clausthal Germany

Contributed paper

Keywords: Mathematical Programming, Stochastic Models, EWG EUROPT Continuous Optimization Working Group

We present results on the average behaviour of IPMs for Linear Programming -- based on the Rotation-Symmetry-Model as a probabilistic model. We present upper bounds on the average number of iterations to find a starting point for IPMs and on the average number of steps until the optimal solution can be found by a projection procedure. So far, only high probability results resp. conditional expected values were known under the Rotation-Symmetry-Model. The new results on the average number of steps are total expectations and are valid for all dimensions. We will also present empirical results.

Paper-ID: 334

An Iterative Method for LC1 Optimization Problems

DJURANOVIC-MILICIC Nada
Serbia and Montenegro

Contributed paper

Keywords: Mathematical Programming, Programming, Nonlinear

In this paper an algorithm for minimization of locally Lipschitzian functions, which uses the second order Dini upper directional derivative is considered. The purpose of the paper is to establish for this algorithm general hypotheses under which convergence occurs to optimal points. A convergence proof is given, as well as an estimate of the rate of convergence.

Paper-ID: 1134

An heuristic method for the approximation of descent directions in convex bilevel programming

CODINA Esteve
UPC Spain

Contributed paper

Keywords: Mathematical Programming, Programming, Nonlinear

Approximating descent directions in many non differentiable programs is a key step of the algorithmic strategies (for instance the bundle trust methods). Many authors reformulate bi-level programming problems with uniqueness of solutions in the lower level as non

differentiable programs. This contribution presents a technique for the approximation of elements of Clarke's sub-differential valid for the case of convex bi-level programs and an extension when strong second order conditions are satisfied at a solution point of the lower level program. The application of this technique for general convex bi-level problems is shown and special emphasis is devoted to nonlinear network flows.

Paper-ID: 1411

Development of an Integrated Lot Sizing and Sequencing Model for Multi Item Capacitated Environments with Sequence Dependent Setups

KOCLAR Ayse
SURAL Haldun
METU Turkey

Contributed paper

Keywords: Mathematical Programming, Production and Inventory Systems

In this study, we consider the multi item lot sizing and sequencing problem in capacitated environments featuring intensively time consuming sequence dependent setups, which necessitate the integration of the lot sizing and sequencing steps in the production plan. Formulating a nonlinear mathematical model, we develop an iterative procedure to tackle the solution of the problem by decomposing it into sub-problems for lot sizing and sequencing respectively. Results are discussed.

MC13, 14:00 – 15:30 — Executive Room Gamma
Competitive Location (C47)

Chair: BERMAN Oded

Paper-ID: 1338

Competitive Facilities Location and Design Problem on a Network

BERMAN Oded
University of Toronto Canada

KRASS Dmitry
University of Toronto - Rotman School of Management Canada

ABOOLIAN Robert
California State University San Marcos United States

Contributed paper

Keywords: Facilities Planning and Design, Location

We describe some recent approaches for selecting optimal locations and designs for a set of facilities on a network, which may already contain some competitive facilities. We will concentrate on models where the number, locations and designs of service facilities affects the total available demand. Our approach allows for unified treatment of locational and design aspects, and yields interesting insights on the patters of spatial competition that may develop.

Paper-ID: 948

Minimising cannibalisation and/or competitor reaction risk in competitive planar facility location

PLASTRIA Frank
Vrije Universiteit Brussel Belgium

Contributed paper

Keywords: Facilities Planning and Design, Location, EWG LA Locational Analysis

A single facility must be located in the plane competing with fixed existing facilities, some belonging to the same chain, others to competing chains. Demand points patronise the facility to which they are most attracted. Attraction is increasing with the quality of the facility and decreasing with its distance to demand. We study the lexicographic optimisation problem with primary objective to maximise the total market share of the chain, and secondarily to minimise the market losses of friendly facilities and/or the risk that competing facilities would raise their current quality in order to gain back new or lost customers.

Paper-ID: 1079

Competitive location under time-varying demand

SANTOS-PENATE Dolores R.
University of Las Palmas de Gran Canaria Spain

CARRIZOSA EMILIO
GORDILLO José
Universidad de Sevilla Spain

Contributed paper

Keywords:Location

We consider the problem of locating r facilities in a market in which a competing firm is already operating with p facilities. The entering firm plans the installation of its facilities in the time horizon [0,T], and seeks locations and the entering times maximizing profits. Assuming that demands and costs are time-dependent, optimality conditions are obtained, and different demand patterns are analysed. The problem is posed as a mixed integer global optimization problem, heuristically solved via a VNS algorithm.

MC14, 14:00 – 15:30 — Executive Room Delta
Stochastic Models I (C87)

Chair: GARIN M. Araceli

Paper-ID: 166

On solving two stage mixed 0-1 stochastic problems via Benders Decomposition and Branch-and-Fix Coordination

GARIN M. Araceli
Universidad del Pais Vasco Spain

ESCUDERO Laureano Fernando
Universidad Miguel Hernandez Spain

MERINO Maria
SAINZ DE ROZAS Perez
Universidad del Pais Vasco Spain

Contributed paper

Keywords: Stochastic Models

We present a framework for solving two stage mixed 0-1 stochastic problems with full recourse, where the uncertainty lies in the objective function, the constraint matrices, and the right-hand-side coefficients. The first stage constraints of the related Deterministic Equivalent Model have 0-1 and continuous variables. An approach for problem solving based on a splitting variable mathematical representation is considered. The approach uses the Twin Node Family (TNF) concept, within the algorithmic framework so called Branch and Fix Coordination, for satisfying the non-anticipativity constraints, jointly with a Benders Decomposition scheme for solving auxiliary linear models. Some computational experience is reported.

Paper-ID: 174

On solving the ALM problem under uncertainty and logical constraints

MERINO Maria
Universidad del Pais Vasco Spain

ESCUDERO Laureano Fernando
Universidad Miguel Hernandez Spain

GARIN M. Araceli
Universidad del Pais Vasco Spain

SAINZ DE ROZAS Perez
Universidad del Pais Vasco Spain

Contributed paper

Keywords: Stochastic Models

We present a hybrid algorithmic framework for optimizing stochastic mixed 0-1 multistage problems with full recourse, where the uncertainty lies in the objective function, the constraint matrices, and the right-hand-side coefficients. The uncertainty is represented by using a scenario tree. The problem is modelled by a splitting variable representation of the Deterministic Equivalent Model of the stochastic problem, where the 0-1 variables and the continuous variables appear at any stage. The approach is based on a mixture of Branch-and-Fix Coordination and Benders Decomposition schemes.

Paper-ID: 413

The M/M/c retrial queue: Allocation of incoming calls and server idle periods

ARTALEJO Jesus
Complutense University of Madrid Spain

Contributed paper

Keywords: Queuing Systems, Stochastic Models

The aim of this contribution is to introduce a new performance descriptor useful to evaluate the QoS in multichannel retrial queueing system arising in the modelling of

cellular networks, telephone call centers, A channel in a standard queueing system is rendering service in a continuous manner until the queue becomes empty. In a retrial queue a channel remains unavailable over some interval of time after each service completion. Then the channel becomes operative again after a random time determined by a competition among the fresh calls and the repeated attempts generated by the blocked units at the retrial pool.

Paper-ID: 1554

Stochastic Programming and Scenario Generation within a Simulation Framework : an Information Systems perspective

VALENTE Patrick
United Kingdom

MITRA Gautam
Brunel University United Kingdom

BIRBILIS George
DI DOMENICA Nico
CARISMA, Brunel University United Kingdom

Contributed paper

Keywords: Decision Support Systems, Simulation, Stochastic Models

Stochastic Programming brings together models of optimum resource allocation and models of randomness (scenario generators) to create a robust decision making framework. In this paper we investigate the role of stochastic programming and simulation tools within the context of a combined information and decision support system. We analyse the roles of decision models and descriptive models, and also examine how these can be integrated with organisational data. We also investigate the use of On-Line Analytical Processing (OLAP) for advanced data analysis. We finally introduce illustrative examples of optimisation, simulation models and results analysis to explain our multifaceted view of modelling.

MC15, 14:00 – 15:30 VIP Lounge
Telecommunication I (O11)

Chair: FORTZ Bernard

Paper-ID: 1111

A 2-Path Approach for Odd-Diameter-Constrained Spanning and Steiner Trees

GOUVEIA Luis
Portugal

MAGNANTI Thomas
MIT United States

REQUEJO Cristina
Univ. Aveiro Portugal

Paper in an organized session

Keywords: Optimization, Graphs and Networks, Telecommunications

Gouveia and Magnanti described several formulations for diameter-constrained tree problems and showed that models for situations when the diameter is odd proved to be more difficult to solve than those when the diameter is even. We provide an alternate modeling approach for the situation when D is odd which views the feasible set of the linear programming relaxation of the new formulation as the intersection of two integer polyhedra, a "triangle-tree" polyhedra and a constrained path polyhedra. This characterization improves upon a previous model whose linear programming relaxation feasible set is the intersection of three rather than two integer polyhedra.

Paper-ID: 1523

Covering sets of customers with multicast trees

GOURDIN Eric
France

FAURE Nathalie
France Telecom R&D France

CHRETIENNE Philippe
Laboratoire d'informatique de Paris 6 France

SOURD Francis
CNRS France

Paper in an organized session

Keywords: Combinatorial Optimization, Location, Telecommunications

In this talk, we consider the problem of covering sets of customers with multicast trees. Each set of customer corresponds to a same multicast session. The number of simultaneous multicast trees that can be handled by an MPLS/IP network is limited. Therefore, several multicast sessions must be served by the same tree. As a result, some network ressources might be wasted. The optimization problem consists in defining how to group multicast sessions together and to design the multicast trees for each group in order to minimize the waste of network ressources. Several formulations are proposed and compared.

Paper-ID: 1371

On the Two edge-disjoint Hop-constrained Paths Problem

PESNEAU Pierre
Belgium

HUYGENS David
ISRO, Université Libre de Bruxelles Belgium

MAHJOUB Ali Ridha
LIMOS, Université Blaise Pascal France

LABBE Martine
Université Libre de Bruxelles Belgium

Paper in an organized session

Keywords: Combinatorial Optimization, Network Design, Telecommunications

Given a graph G=(V,E), pairs of nodes (s_i,t_i), i=1,...,K, an integer L <= 2 and a cost on the edges, the Two edge-disjoint Hop-constrained Paths Problem consist in finding a minimum cost subgraph of G such that there exist at least two edge-disjoint paths of length <= L between each pairs (s_i,t_i). We discuss an integer programming formulation for this problem. We describe classes of valid inequalities for the associated polytope and give necessary and sufficient conditions for these inequalities to be facet defining. Finally, we present some preliminary results obtained in the framework of a Branch and Cut algorithm.

Paper-ID: 1543

Parallel design of cellular networks

TALBI El-Ghazali
Laboratoire d'Informatique Fondamentale de Lille France

CAHON Sebastien
MELAB Nordine
University of Lille France

Paper in an organized session

Keywords: Metaheuristics, Parallel Algorithms and Implementation, Telecommunications

Cellular network design is a majour issue in mobile telecommunications systems. We propose an evolutionary algorithm to approximate the Pareto frontier of a multi-objective formulation of the problem. Performance evaluation has been carried out on different realistic benchmarks. The obtained results show the impact of the model and the introduced search mechansms. Parallel hierarchical models have also been proposed to improve the search time and the quality of the obtained solutions.

MC16, 14:00 – 15:30 — Syndicate Room A

Forestry Management I (C35)

Chair: UEDA Tohru

Paper-ID: 18

Forecasting methods which combine biological methods and the Kalman filter

UEDA Tohru
Seikei University Japan

TSUYOSHI Nakamura
NEC Japan

Contributed paper

Keywords: Forecasting

The Kalman filter is effective in short-time forecasting because it advances forecasting process together with error adjustment, while such biological models as logistic models and the Bass model are effective in long-term forecasting because their variations in time series have structural meanings. We propose new forecasting methods which combine biological models and the Kalman filter. The Kalman filter is a linear model, but

biological models are usually nonlinear models. New methods approximate structures of biological models with linear models of the Kalman filter. We apply them for monthly sales data of beer and Sake.

Paper-ID: 200

A conditional and structural error correction model: An empirical illustration applied to Andalusia

ISLA Fernando
TRUJILLO Francisco
University of Malaga Spain

Contributed paper

Keywords: Economic Modeling, Forecasting

In this paper we describe and illustrate a methodology to elaborate a Structural Error Correction Model (SECM), using a full system approach. We use the London School of Economics approach known as general to specific modelling and the VAR approach. Following both approaches, we have elaborated a set of reductions for the modelling of structural econometric models which arise as re-parametrisations/reductions of co-integrated VARs. We start with the unrestricted VAR (UVAR) model, and then we use of partial (conditional) system and test the validity of the univariate model through the exogeneity status of the variables on which we condition.

Paper-ID: 1425

The Linear Separability of Data Sets: Geometric Analysis

LEVIN Yuri
Queen's University Canada

BEN-ISRAEL Adi
Rutgers University United States

Contributed paper

Keywords: Data Mining and Data Base Modeling, Forecasting, Medical Applications

Consider datasets with two classes (e.g. test results for healthy and sick clients) in the context of statistical inference (given the test results, is the client sick?). A dataset is called "linearly separable" if elements in different classes can be separated by a linear hyperplane. This property isn't meant in absolute sense, but in a relative sense that allows comparison of datasets in terms of linear separability. We introduce a new criterion,easily computed from the data,that measures the linear separability of the dataset, and predicts whether linear separators would work well. This criterion is applied to UCI Repository Machine Learning Databases.

MC18, 14:00 – 15:30 **Jupiter Lobby**
Discussion Presentations II

Paper-ID: 927, MC18, 14:00-14:30, Panel #13

Compensatory fuzzy programming for decentralized multi-level linear programming (DMLLP) problems

TIRYAKI Fatma
YILDIZ TECHNICAL UNIVERSITY Turkey

Discussion presentation paper

Keywords: Analytic Hierarchy Process, Fuzzy Sets and Systems, Multi-Objective Decision Making

This paper presents compensatory fuzzy programming for DMLLP. The weights of objectives at each level are assigned by the next upper level by using AHP. The weight of any objective for whole system is equal to the product of the weights on the path tying it to DMo. With these weights, an equivalence among the satisfactory levels of the objectives is formed. Compensatory operators are introduced for adjusting the decision making process between the different levels and also between the decision makers of the same level. Consequently, a set of compromise solutions depending on the compensation parameter is obtained.

Paper-ID: 1198, MC18, 14:00-14:3, Panel #22

Exploitation of the organization of fisheries data for the sustainable fishery management of lake Volvi (Greece)

KOKKINAKIS Antonis
ANDREOPOULOU Zacharoula
Aristotle University of Thessaloniki

ECONOMIDIS Georgios
Prefecture of Thessaloniki Greece

Discussion presentation paper

Keywords: Environmental Management, Management Information Systems, Natural Resources

Lake Volvi in northern Greece is one of the biggest lakes in Balkan Peninsula with an important fishery production. Data concerning fishery production on various species organized for the last 25 years are exploited to describe its dynamic fishery capability and the effectiveness of the applied fishery management. Data analysis specifies the effects of the environmental changes in the fisheries and suggests a more effective model for fishery management, which will be well adapted with the natural environmental conditions of the ecosystem and the necessities of its fisheries administrators, also aiming in the upgrade of fisheries production and environmental protection.

Paper-ID: 1217, MC18, 14:00-14:30, Panel #31

Total Saving Model for A Special Order with Temporal Reduction in Unit Cost of Product

HAJI Alireza
HAJI Rasoul
Sharif University of Technology Iran, Islamic Republic Of

TAGHIZADEH Houshang
Aazad University - Branch of Science & Researches Iran, Islamic Republic Of

Discussion presentation paper

Keywords: Production and Inventory Systems

In this paper we consider a deterministic inventory system in which Shortage are not allowed and the demand for product is continuous and has a constant rate. In this system we assume the unit price of product during a known cycle time is reduced temporarily and the amount of reduction in unit price depends on the amount of special order in that cycle. In this paper a model for the total savings in costs in terms of the amount of special order is obtained for the above system.

Paper-ID: 706, MC18, 14:00-14:30 Panel #4

The Impacts of Fragmented Volatilities by Learning about Predictability in the Real Options Approach

SHIBATA Takashi
KIJIMA Masaaki
Kyoto University Japan

Discussion presentation paper

Keywords: Finance and Banking, Financial Engineering, Financial Modelling

This paper examines the effects of uncertainty through dynamic learning about the firm's project value in the real options framework. We extend the real options framework with incomplete information by allowing an unobserved state variable that drives profits to follow a stochastic process with market uncertainty. Similar to the proposition in the standard real options approach where complete information is available, we find that in the situation with incomplete information the project value increases as the market uncertainty increases. Furthermore, we demonstrate that the project value increases as both information uncertainty decreases and estimation uncertainty increases.

Paper-ID: 1454, MC18, 14:00-14:30, Panel #40

A LOCATION MODEL FOR FIRM EXPANSION WITH SPATIAL PRICE DISCRIMINATION

PELEGRIN Blas
FERNANDEZ Pascual
FERNANDEZ Jose
Universidad de Murcia Spain

GARCIA Maria D.
Universidad Catolica San Antonio de Murcia Spain

Discussion presentation paper

Keywords: Location

A firm owing k facilities wants to locate s new facilities for profit maximization in competition with other firms that practice spatial price discrimination. Each customer buys at the facility offering the lowest price. The firm have to make decisions on location for the new facilities and on price for all its facilities. The firm consider the maximization of the profit obtained by its existing facilities as a secondary objective. We first determine

optimal prices in the long-term price competition. Then, the location-price problem is reduced to a location problem which is formulated as a bi-objective integer programming.

Paper-ID: 965, MC18, 14:30-15:00, Panel #14

Dynamic algorithms for an Internet-based service for freight transportation companies

COSLOVICH Luca
University of Trieste Italy
PESENTI Raffaele
Universitá di Palermo Italy
UKOVICH Walter
University of Trieste Italy

Discussion presentation paper

Keywords: Decision Support Systems, Routing, Transportation and Logistics

This work introduces two algorithms for a Decision Support System (DSS) for freight transportation companies service providers. The main aim of the DSS is to select in real-time, within an on-line database, particular transportation orders that may be profitably executed by some freight transportation companies. In particular, customer shipping agents can publish their requests for freight transportation on the on-line database, and customer freight transportation companies can seek in the database for profitable orders to book. As time flows, new transportation orders are being entered in the database. The real case of an Italian service provider is analyzed.

Paper-ID: 1204, MC18, 14:30-15:00, Panel #23

Role of Information Technology on the Improvement of Health Care

AJAMI sima
Iran, Islamic Republic Of

Discussion presentation paper

Keywords: Health Care

The information is used to improve the strategies and processes for health care delivery and the capacity of the health care system to respond to the need of the community. We need more information in health care than ever before. We need to 1) achieve better health care quality outcomes and cost efficiencies in providing health services, 2)extend access to larger patient populations and health care information to more users. Hence strategic uses of IT can facilitate rapid access to critical health information and knowledge for providers and consumers alike to support all kinds of administrative and clinical decisions.

Paper-ID: 1455, MC18, 14:30-15:00, Panel #32

MAXPROFIT LOCATION MODELS UNDER THE ASSUMPTION OF SPATIAL PRICE DISCRIMINATION

PELEGRIN Blas
FERNANDEZ Pascual
Universidad de Murcia Spain

GARCIA Maria D.
Universidad Catolica San Antonio de Murcia Spain

Discussion presentation paper

Keywords: Location

We examine a location-price problem for an entrant firm in competition with other firms that practice spatial price discrimination. The production costs for the firms are different and depending on the location of their facilities. Each customer buys at the facility offering the lowest price. We first determine optimal prices in the long-term price competition. Then, in order to maximise profit, the location-price problem is reduced to a location problem which is formulated as an integer programming model if a finite set of possible locations for the entrant firm is considered.

Paper-ID: 1114, MC18, 14:30-15:00, Panel #41

A Column Generation Approach for the Capacitated Arc Routing Problem

BELENGUER Jose M.
BENAVENT Enrique
GOMEZ-CABRERO David
Universitat de Valencia Spain

Discussion presentation paper

Keywords: Combinatorial Optimization, Programming, Integer, Routing

This work describes a Column Generation Method based on a set covering formulation to obtain a lower bound for the Capacitated Arc Routing Problem (CARP). The subproblem is relaxed and solved using a pseudo polynomial dynamic programming algorithm that may produce routes that can serve several times a required edge. The formulation is strengthened by adding capacity and odd edge cut-set constraints, while preserving the complexity of the method that solves the subproblem. The method has been tested on two sets of instances taken from the literature and the results are competitive with the best known lower bounds.

Paper-ID: 710, MC18, 14:30-15:00, Panel #5

Production management of research projects

BALABAN Nikola
BALABAN Nedjo
RISTIC Zivan
University of Novi Sad Serbia and Montenegro

Discussion presentation paper

Keywords: Project Management and Scheduling, Research and Development

There are good reasons to believe that, incomparably and without a good reason, more attention is dedicated towards project management then managing production of projects . In this statement we expose one concept for managing development of research projects and description of computer program that we developed for supporting production management of research projects and programs. That computer program supports usage of one creative technique & technique of nominal groups in defining and evaluating research problems, as well as finding and evaluating test solutions for the chosen problem. Statement describes how computer program supports formative evaluation and summative evaluation.

Paper-ID: 972, MC18, 15:00-15:30, Panel #15

The importance of innovation and knowledge management in the modernization of public organizations in Greece

FILIPPIDOU Sofia
KOSTOPOULOS Konstantinos
BRACHOS Dimitris
PRASTACOS Gregory
Athens University of Economics and Business Greece

Discussion presentation paper

Keywords: Innovation, OR/MS and the Public Sector

This paper is intended to analyze frameworks provided by the Greek Central Administration in order to implement public management reform and to promote and spread the innovation and knowledge within the public sector organizations, both at a national and at a local level. The analysis is embedded in a theoretical framework based on the international literature review on public management reform, innovation management and knowledge management in the public sector, as well as on an international presentation of some of the public administration best practices' mechanisms.

Paper-ID: 1467, MC18, 15:00-15:30, Panel #24

Deficiency in information system, an obstacle for strategy of Total Quality Management (TQM)

AHMADIAN leila
KHAJOUEI reza
kerman medical sciences university Iran, Islamic Republic Of

Discussion presentation paper

Keywords: Management Information Systems, Quality Management

According to TQM principle, improvement of processes is possible based on produced information. Although, the strategy of the quality is complete by itself, but the information system deficiency has caused some problems in it. So, during the strategy of TQM, reforming of information system must be considered. We need information system to improve the processes and for delivering the results as only thing that can describe this management system. In this article, the role, importance and circumstances of providing an information system throughout the TQM describes, then the importance of information in nine steps of FOCUS-PDCA reviews.

Paper-ID: 1601, MC18, 15:00-15:30, Panel #33

Sequential options with interacting learning anc control actions

MARTZOUKOS Spiros
KOUSSIS Nikos
TRIGEORGIS Lenos
University of Cyprus Cyprus

Discussion presentation paper

Keywords: Financial Modelling

We study the interaction (with path-dependency) between (optional and costly) learning and value-enhancing actions with random outcome before irreversible

investment decisions are made, employing a jump-diffusion or a diffusion process. This allows the study of actions (and their optimal timing)to change the distribution of future payoffs through for example R&D, marketing research, advertisement, basic research, exploration actions, etc. We provide analytic formulas and a numerical approach for sequential options and we investigate the optimal decision regions.

Paper-ID: 1180, MC18, 15:00-15:30, Panel #42

TQM IMPACTS ON CORPORATE PERFORMANCE: AN ANALYSIS AND EMPIRICAL STUDY AMONG TURKISH FIRMS

PAKDIL Fatma
CEYHAN Mehmet
Baskent University Turkey

Discussion presentation paper

Keywords: Quality Management

Quality, efficiency and high-level corporate performance are the most important strategic objectives for the organizations that aim to gain competitive advantage and Total Quality Management (TQM) is one of the most effective management strategies to reach these objectives. This study aims to find out if TQM practices improve corporate performance among Turkish firms that have a national or international quality awards between 1993 and 2003 in terms of financial, operational, customer satisfaction, employee-related results and supplier performance indicators.

Paper-ID: 720, MC18, 15:00-15:30, Panel #6

A Multicriteria DSS for a Stock Evaluation Using Fundamental Analysis

SAMARAS Georgios
Technological Education Institution of Larissa-Greece Greece

MATSATSINIS Nikolaos
Technical University of Crete Greece

ZOPOUNIDIS Constantin
Technical University of Crete Greece

Discussion presentation paper

Keywords: Decision Support Systems, Financial Engineering, Multi-Criteria Decision Aids

The paper describes a Multicriteria DSS which evaluates the ASE stocks, based on the technique of fundamental analysis ratios. The system utilises multicriteria analysis methodologies in order to rank the stocks by placing the best stock first and the worst last. The final output of the DSS is four rankings which respond to four different criteria groups, depending on the type of accounting plan (Commerce/Industrial, Banks, Insurances, Investments), each listed company belongs to. The system incorporates a large volume of relevant information and operates in 'real world conditions'. Finally, the system is intended for both institutional and private investors.

Parallel Sessions

Monday, July 5

MD02, 16:00 – 17:30 **Delphi Amphitheater**
Scheduling: Single machine (C82)

Chair: GORDON Valery

Paper-ID: 378
Scheduling problems with assigned due dates

GORDON Valery
United Institute of Informatics Problems, National Academy of Sciences of Belarus, Surganov Str. 6, 220012, Minsk, Belarus (Phone: + 375 172 842 125, Fax: + 375 172 318 403,
E-mail: gordon@newman.bas-net. by)

Contributed paper

Keywords: Scheduling

Single machine scheduling problems with due dates assigned depending on processing times are considered (assignment policies with common slack due dates, total-work-content or processing-plus-wait due dates). We mainly concentrate on polynomially solvable problems where objective functions can be maximum tardiness, or total weighted earliness-tardiness, or earliness costs with no tardy jobs. The work is supported in part by ISTC (project B-986) and INTAS (project 03-51-5501).

Paper-ID: 672
A Genetic Algorithm for Single Machine Scheduling with Family Setup Times to Minimise Maximum Lateness

LEE Lai-Soon
POTTS Chris
BENNELL Julia
University of Southampton United Kingdom

Contributed paper

Keywords: Metaheuristics, Scheduling

This paper discusses a genetic algorithm to minimise the maximum lateness of jobs for a single machine scheduling problem with family setup times. A family setup time is required at the start of the schedule and between batches, where a batch is a largest set of contiguously scheduled jobs from a same family. We propose a GA for this problem that uses a binary representation to define the partition of families into batches. The GA proposed utilises an optimised crossover in an effort to achieve enhanced solutions. The computational results are compared with a tabu search and descent method.

Paper-ID: 911
Customer order scheduling on a single machine with release dates

ESSAFI Imen
DAUZERE-PERES Stéphane
LAHLOU Chams
Ecole des Mines de Nantes- IRRCyN France

Contributed paper

Keywords: Combinatorial Optimization, Complexity and Approximation, Scheduling

We consider scheduling problems in which each customer order consists of a collection of independent jobs to be processed on a single machine. Each order has an associated release date and a due date and must be shipped as a whole, only on completion of the last job of the order. We show special cases where there exist optimal solutions in which jobs of an order can be processed consecutively. In the general case, multi-job orders can be interrupted to process jobs associated to other orders. We address several order related objectives and develop some heuristics .

Paper ID: 1689

One-machine Scheduling with Chain Precedence Relations: a Polyhedral Study

ARBIB Claudio
University of L'Aquila, Italy

LABBÉ Martine
ULB, Bruxelles, Belgique

SERVILIO Mara
University of L'Aquila, Italy

Contributed paper

Keywords: Combinatorial Optimization, Scheduling

We investigate a time-indexed formulation of a one-machine problem with unit jobs and chain-like precedence relations, motivated by the sequential transmission of packets to users through one physical channel. The problem of minimizing the maximum cost of a chain is NP-hard for two chains and regular functions. We focus on min-sum and general cost functions, studying the convex hull of feasible assignments of jobs to time slots. For one chain, we give a complete description of the polytope. For two chains, we prove that the polytope is full-dimensional and describe facet-defining inequalities. A dynamic programming algorithm is provided.

MD03, 16:00 – 17:30 Athena
Combinatorial Optimization: Integer Programming Models (C11)

Chair: SALAZAR GONZALEZ Juan José

Paper-ID: 1326

Solving a cell-perturbation problem in Statistical Disclosure Control

SALAZAR GONZALEZ Juan José
Universidad de La Laguna (Tenerife) Spain

Contributed paper

Keywords: Combinatorial Optimization, Large Scale Optimization, Programming, Integer

Rounding methods are common techniques in many statistical offices to protect sensitive information when publishing data in tabular form. The classical version of these methods do not consider protection levels while searching patterns with

minimum information loss, and therefore typically the so-called auditing phase is required to check the protection of the proposed patterns. This talk presents a mathematical model for the whole problem of finding a protected pattern with minimum loss of information, and proposes a branch-and-cut algorithm to solve it. We describe a new methodology closely related with the classical controlled rounding methods but with several advantages.

Paper-ID: 415

The Capacitated m-Ring-Star Problem

BALDACCI Roberto
DELL'AMICO Mauro
University of Modena and Reggio Emilia Italy

SALAZAR GONZALEZ Juan José
Universidad de La Laguna (Tenerife) Spain

Contributed paper

Keywords: Combinatorial Optimization, Programming, Integer, Telecommunications

The Capacitated m-Ring-Star Problem (CmRSP) is the problem of designing a set of rings passing through a central depot and through some transition points and/or customers, and to assign each non-visited customer to a visited point or customer. The objective is to minimize the total routing cost plus assignment costs. This paper presents and discusses two integer programming formulations for the CmRSP. Valid inequalities are proposed to strengthen the linear programming relaxation, and used within appropriated separation procedures in a branch-and-cut approach. The procedure has been tested on a large family of instances showing the good performance of the proposal.

Paper-ID: 944

Combining Integer and Constraint Programming for assignment problems

MOURTOS Ioannis
Athens University of Economics and Business

MAGOS Dimitris
Technological Educational Institute of Athens Greece

APPA Gautam
London School of Economics United Kingdom

Contributed paper

Keywords: Combinatorial Optimization, Programming, Integer

We introduce an Integer Programming (IP) model for multidimensional assignment problems and present a number of results for the associated polytope. Representing assignment structures via Constraint Programming (CP) results in models comprising of multiple all_different predicates. Hence, we examine sets of two or three all_different constraints and provide a facial characterisation in order to enable the combination of CP and IP techniques. Finally, we discuss algorithmic issues along with presenting some preliminary computational experience.

Paper-ID: 1514

Finding Effecient Solutions for Zero-One Programming

SADEH Arik
Holon Academic Institute of Technology Israel

SHARLIN-BILITZKY Ariela
College of Managment-academic studies Israel

Contributed paper

Keywords:Combinatorial Optimization, Data Mining and Data Base Modeling, Programming, Integer

We consider a zero-one linear programming and we prove that for certain values of the parameters, the solution of the linear relaxation of the problem is integral and can be either predetermined or computed efficiently. In general, a tight upper bound is provided to establish an efficient procedure to solve the problem. The results may have practical implementations in reliability, statistical studies and data mining.

MD04, 16:00 – 17:30 **Salon des Roses A**

EWG MCAD: Applications (O13)

Chair: CLIMACO Joáo

Paper-ID: 622

Selection of an Enterprise Resource Planning system using Analytic Network Process: The case of Turkey

CEVIK Sezi
Turkey

AKTAS Emel
TOPCU Y. Ilker
Istanbul Technical University Turkey

Contributed paper

Keywords: Enterprise Resource Planning Systems, Multi-Criteria Decision Aids, EWG ESIGMA Special interest group on Multicriteria Analysis

In today's business world, companies face increasing competition, expanding markets, and rising customer expectations. Because of this pressure, companies may require an integrated and comprehensive software package (ERP system) that automates flow of materials, information, and financial resources among all functions and departments within an enterprise on a common database. Selecting an ERP project is a resource, time, and cost consuming task. Wrong selections may cause dramatic weaknesses, especially in small and middle enterprises. The complexity of this selection necessitates a multi-criteria decision aid approach. For this purpose, this paper presents an integrated framework based on ANP utilizing Delphi Technique.

Parallel Sessions

Monday, July 5

Paper-ID: 500

Capacitated Single Allocation Hub Location Problems - A Bicriteria Approach

COSTA Maria da Graéa
Escola Superior de Ciencias Empresariais - Instituto Politecnico de Setébal Portugal

CAPTIVO Maria Eugénia
Faculdade de Ciencias da Universidade de Lisboa Portugal

CLIMACO Joáo
UNIV. COIMBRA, INESC Portugal

Paper in an organized session

Keywords: Facilities Planning and Design, Location, Multi-Criteria Decision Aids

A bicriteria single allocation hub location model is presented. We suggest, as an alternative to the capacitated hubs, the use of a second objective function that tries to minimize the time to process the flow entering the hubs. Our bicriteria model is tested on the AP data set for 10, 20, 25 and 40 nodes, analyzing the correspondent nondominated solution set. The increased information provided by the nondominated solutions of the bicriteria model when compared to the unique solution given by the capacitated hub location model is highlighted.

Paper-ID: 635

On Multicriteria Approaches Dedicated to Routing in Telecommunication Networks

CLIMACO Joáo
UNIV. COIMBRA, INESC Portugal

CRAVEIRINHA José
Faculty of Sciences and Technology, University of Coimbra and INESC-Coimbra Portugal

Paper in an organized session

Keywords: Multi-Criteria Decision Aids, Routing

Modern multiservice networks routing methods deal with multiple, heterogeneous quality of service parameters. In this context the routing problem involves the selection of a chain of network resources satisfying certain technical requirements and seeking to optimise some relevant metrics. In this communication we start by presenting a short overview on the state of the art concerning the use of multicriteria approaches in this area, focusing on applications, models and methodologies. Taking into account the experience of the author's research group in this area we will also outline future challenges, for instance in the future Internet and optical networks.

MD05, 16:00 – 17:30 **Salon des Roses B**

EWG ESIGMA: Uncertainty and Problem Structuring (O27)

Chair: STEWART Theo

Paper-ID: 1150

The Evidential Reasoning Approach for Multiple Attribute Decision Analysis Using Interval Belief Degrees

YANG Jian-Bo
WANG Ying-Ming
XU Dong-Ling
UMIST United Kingdom

Paper in an organized session

Keywords: Group Decision Making and Negotiation, Multi-Objective Decision Making, EWG ESIGMA Special interest group on Multicriteria Analysis

In this paper, the Evidential Reasoning (ER) approach is enhanced to model interval belief degrees and interval numerical data. The Dempster-Shafer (D-S) theory of evidence is first extended. The focus is put on the process of combining and normalising interval evidence. To ensure that the process does not depend on the order in which evidence is combined, an analytical ER algorithm is used to combine evidence simultaneously before normalisation. Two optimisation models are constructed to estimate the upper and lower bounds of combined belief degrees. Interval data can be transformed to interval belief degrees and incorporated in the optimisation models.

Paper-ID: 1147

Process difficulties with eMCDM

BRUGHA Cathal
University College Dublin Ireland

Paper in an organized session

Keywords: Decision Theory and Analysis, Multi-Criteria Decision Aids, EWG ESIGMA Special interest group on Multicriteria Analysis

We express doubts that e_Commerce-based facilitation will help the process of solving multi-criteria decisions. Reasons for this view arise from the following: A quality MCDM process depends on the relationship between the decision-advisor (DA) and decision-makers (DMs). The DA starts with knowledge of the process, and little about the problem. It is the reverse with DMs. At times the DA must convince DMs to use appropriate methods and techniques. At other times the DA must evince information and views from the DMs. While some of the DA's role could be automated, much of it relies on personal interaction with DMs.

Paper-ID: 748

A DSS for the selection of a Cleaning Service Supplier in a European Underground

JIMENEZ Antonio
School of Computer Science. Technical University of Madrid Spain

RIOS-INSUA Sixto
MATEOS Alfonso
RODRIGUEZ Luis Carlos
Technical University of Madrid Spain

Contributed paper

Keywords: EWG MCAD Multi-Criteria Aid for Decision, EWG Decision Support Systems

We introduce a complex decision-making problem, the selection of a cleaning service supplier in a European public underground transportation company, where several conflicting criteria must be taken into account simultaneously, such as costs, service quality, technical resources or graffiti prevention and cleanup. A decision support system, GMAA, is proposed to select the best offer. It is based on the Decision Analysis cycle and accounts for incomplete information concerning the inputs. Consequently, the so-called decision-making with partial information plays a key role, like the assessment of non-dominated and potentially optimal alternatives and the application of Monte Carlo simulation techniques.

Paper-ID: 1097

Scenario Planning and Multiple Criteria Decision Analysis

STEWART Theo
University of Cape Town South Africa

Paper in an organized session

Keywords: Multi-Criteria Decision Aids, EWG ESIGMA Special interest group on Multicriteria Analysis

Scenario Planning is widely used for strategic decision making, but usually does not adopt formal decision analytic methods. On the other hand, MCDA often makes little formal provision for dealing with the substantial uncertainties which characterize strategic planning. We discuss different approaches to integrating MCDA and scenario planning for decision analysis in strategic planning contexts. A series of simulation studies is presented, in which the potential for representing uncertainties in MCDA by means of 3-5 scenarios is demonstrated. The simulation studies suggest that the scenarios may need to be constructed somewhat differently to those in conventional scenario planning.

MD06, 16:00 – 17:30 **Nafsica A**

Supply Chain Management III (C94)

Chair: TARANTILIS Christos

Paper-ID: 153

International Strategic Network Planning: a Case Study

LEBRETON Baptiste
Universität Augsburg, WiWi-Fakultät Germany

TUMA Axel
University of Augsburg Germany

Contributed paper

Keywords: Network Design, Strategic Planning and Management, Supply Chain Management

Nowadays, first and second tier suppliers in the car industry are obliged to keep pace with the world-wide expansion of OEMs. For reasons of efficiency, OEMs often requires suppliers to follow them in the foreign markets and to settle their production lines close to the local markets. Unlike classical warehouse location problems, international strategic network planning raises new problems as toll, exchange rates fluctuations and multi-periodic capital spending. Furthermore, international expansion is often accompanied by a delocalization or reorganization of current factories, that also causes close-down expenses. Goal of this article is to present a practicable model encompassing these issues.

Paper-ID: 868

Operational planning of material handling systems based on a vehicle routing metaheuristic

PARASKEVOPOULOS Dimitris
Greece

TARANTILIS Christos
IOANNOU George
PRASTACOS Gregory
Athens University of Economics and Business Greece

Contributed paper

Keywords: Metaheuristics, Routing, Supply Chain Management

In this paper we consider the problem of minimizing material handlings costs in manufacturing systems or warehousing facilities, subject to constraints that restrict the start and end time of each production or picking/packaging activity, according to pre-specified daily operational schedules and process planning information. The underlying decision problem is modeled using an integer programming formulation similar to the vehicle routing problem with time windows. Since the problem is NP-complete, we develop an efficient meta-heuristic to solve it.

MD07, 16:00 – 17:30 **Nefeli B**

Data Envelopment Analysis III (C18)

Chair: KWAK N. K.

Paper-ID: 68

Assessing Global Business Performance in Emerging Countries

KWAK N. K.
St. Louis University

LEE Chang W.
Jinju National University

Contributed paper

Keywords: Data Envelopment Analysis, Global Operations

An appropriate assessment of business performance in emerging countries is an important management concern in terms of global decision-making. Data envelopment analysis (DEA) is utilized for performance measurement in efficient frontiers among decision-making units (DMUs). Emerging and advanced countries are used as DMUs. The proposed DEA model measures financial and non-financial indicators in global business settings. The model takes multiple inputs and outputs and performs an appropriate analysis to assess the relative efficiency of the DMUs. It identifies and compares the best practice group and peer group by multiple input-output indices and allows decision-makers to implement better global operational systems.

Paper-ID: 122

Sales vs. Service in the Bank Branch: DEA Comparison and Aggregation

DAMASKOS Xenophon
NATIONAL BANK OF GREECE Greece

Contributed paper

Keywords: Data Envelopment Analysis, Finance and Banking, EWG EUROBANKING special interest group in banking

Sales and service-providing are the two components of the branch efficiency issue, in temporary commercial-banking environment. This study proposes a DEA modeling, so as to compare and aggregate this dual nature of branches, with an application to a Greek banking network. The results offer the appropriate information to aid superior insight towards the microeconomic level of the branch's production technology, for further SWOT analysis and target setting.

Paper-ID: 963

Comparative Efficiency Analysis of Portuguese Bank Branches

PORTELA Maria
Portugal

THANASSOULIS Emmanuel
Aston University United Kingdom

Contributed paper

Keywords: Data Envelopment Analysis, Finance and Banking

The advent of Internet banking and phone banking is changing the role of bank branches from a predominantly transaction-based one to a sales-oriented role. This paper reports on an assessment of the branches of a Portuguese bank in terms of their performance in three different areas: Their efficiency in fostering the use of new transaction channels, their efficiency in increasing sales and customers, and their efficiency in generating profits. Service quality is also a major issue in bank branches, and therefore we analyse the way this dimension has been accounted for and take it into account in our empirical application.

Paper-ID: 300

Cost efficiency measurement with price uncertainty

CAMANHO Ana
Universidade do Porto

DYSON Robert
University of Warwick United Kingdom

Contributed paper

Keywords: Data Envelopment Analysis, Finance and Banking

This paper enhances cost efficiency measurement methods to account for scenarios of incomplete price information. The main contribution consists of the development of a method for the estimation of upper and lower bounds for the cost efficiency measure in situations of price uncertainty, where only the maximal and minimal bounds of input prices can be estimated for each DMU. The assessments under price uncertainty are based on extensions to the Data Envelopment Analysis model that incorporate weight restrictions of the form of assurance regions. The applicability of the models developed is illustrated in the assessment of bank branch performance.

MD08, 16:00 – 17:30 — Nafsica B
Meta-Heuristics I (C16)

Chair: LEE Moon-Kyu

Paper-ID: 657

Dealing with low demand in cutting stock problems - greedy heuristics versus column generation approaches

POLDI Kelly
Brazil

ARENALES Marcos
Instituto de Ciencias Matemetica e de Computaio - ICMC/USP Brazil

Contributed paper

Keywords: Cutting and Packing

This paper deals with the classical integer cutting stock problem. We have studied the case in which there are several lengths of available bars in limited quantities; we have

focused on the special case in which the quantity demanded of each item is low. Some heuristic methods are given in order to obtain an integer solution, which can be classified as constructive or residual. These heuristics are empirically analysed, i.e., by solving a set of randomly generated instances. The analysis showed the residual heuristics, based on the classical linear optimisation approach, are clearly superior.

Paper-ID: 1458

A Genetic Algorithm of Determining Optimal Laser-Torch Paths for Cutting 2D Parts

LEE Moon-Kyu
KWON Ki-Bum
Keimyung University Korea, Republic Of

Contributed paper

Keywords: Cutting and Packing, Routing, Search Algorithms

This paper deals with the problem of generating torch paths for 2D laser cutting of a 2D stock plate nested with a set of free-formed parts. The objective is to minimize the total length of the torch path starting from a known depot, then visiting all the given parts, and returning back to the depot. Since the piercing point of each part is not given, the location is treated as a continuous variable. To solve the problem, a real-coded genetic algorithm with an arithmetic operator is proposed. Computational results are provided to illustrate the validity of the proposed algorithm.

Paper-ID: 5

Solution Algorithms for estimating the number of an airport gates

CHIU Hsien-Ming
Tamkang University Taiwan, Province Of China

Contributed paper

Keywords: Mathematical Programming, Metaheuristics, Network Design

The number of gates and their usage efficiency are essential to airport level of service. In this research, we employ the network flow techniques to develop several gate assignment models, together with robust optimization, to solve the minimum number of gates for airport short-term and long-term operations. Finally, the validation of the models and the two types of solution algorithms, i.e., Lagrangian Relaxation and Genetic Algorithms, are evaluated in the research. Based on the results of case studies, we conclude the model can be used in determining the minimum gate number by either algorithm we tested in this research.

MD09, 16:00 – 17:30 **Jupiter (small)**
Financial Engineering II (C30)

Chair: URATANI Tadashi

Paper-ID: 1433
Risk Management in Project Financing

URATANI Tadashi
Hosei University

Contributed paper

Keywords: Entrepreneurship, Financial Engineering, Financial Modelling

Project Financing is a leveraged financing technology for large scale projects. Sponsors manage the project and maximize the expected profit for the equity investment. Lenders control the risk through due-diligent; Cash flow coverage ratio, Interest coverage ratio and Debt service coverage ratio for protecting loan asset. The risk management is performed under 1% default probability. The government could promote the project by tax and equity participation. We propose a simple mathematical model for three project agents who have each objective and strategies and obtain some conditions for success of project by three corporation.

Paper-ID: 650
A Dynamic Programming Approach for Pricing Options Embedded in Bonds

BRETON Michèle
GERAD and HEC Montréal Canada

BEN AMEUR Hatem
HEC Montréal Canada

KAROUI Lotfi
McGill University Canada

L'ECUYER Pierre
GERAD and Université de Montréal Canada

Contributed paper

Keywords: Financial Engineering, Programming, Dynamic

The aim of this paper is to price options embedded in bonds in a DP framework, the focus being on call and put options with advance notice. A DP procedure is presented and implemented for the Vasicek and CIR models of interest rate dynamics. Results are compared with those of two previously proposed methods and show efficiency and robustness.

Paper-ID: 677

An upwind finite element for two factor convertible bonds valuation

DE FRUTOS Javier
Universidad de Valladolid Spain

Contributed paper

Keywords: Financial Engineering

We present a finite element method for the numerical solution of two factor convertible bonds models. The method has the upwinding capabilities that are needed when for some values of the parameters the model become convection dominated. The time integration is carried out by means of an implicit-explicit Runge-Kutta method. The time integrator, when implemented in variable-step mode, has been proved to be the valuation of derivative securities. Our algorithm is general enough to easily accommodate a number of early exercise provisions. In the paper we adopt the Vasicek model and discuss the appropriate modifications to handle other model specifications.

Paper-ID: 850

Estimation of Toll Prices on Build _ Operation _ Transfer (BOT) Projects with the Use of the Multi-Parametric Model

CHRISTAKOS evangelos
Greece

KALFAKAKOU GLYKERIA
LATINOPOULOS Perikles
ARISTOTLE UNIVERSITY OF THESSALONIKI Greece

Contributed paper

Keywords: Economic Modeling, Engineering Management, Financial Engineering

BOT projects are distinguished for their difficulty in attracting contractors and investors .The many uncertainties at construction and operation of these projects raise difficulties at the growth of the particular method. For such a collaboration between the Public and the Private sector, is essential to know the attractiveness and the viability of the investment. These factors depend on many parameters. The most important is the tolls price. In this study is calculated the particular price through a multi-parametric analysis, using as main variables, the total duration of the concession and the internal degree of yields of the equity funds.

MD10, 16:00 – 17:30 **Nefeli A**
Health Care (C43)

Chair: BAYER Steffen

Paper-ID:1016

Examining the systemic implications of innovation in care delivery: a system dynamics approach

BAYER Steffen
BARLOW James

CURRY Richard
Imperial College London United Kingdom

Contributed paper

Keywords: Health Care, System Dynamics and Theory

In this paper we examine the systemic implications of a particular health service innovation: telecare. We employ a system dynamics approach to examine the distribution of costs and benefits between different institutions and individuals and to explore the influences on other parts of the care system. This approach allows us to gain insights which cannot be captured from the study of particular instances of telecare implementation studied in isolation. Outcomes depend crucially on specific assumptions about the impact of the medical intervention and on the structure of the wider care delivery system.

Paper-ID: 114

Needs Assessment In Health Sector

YARMOHAMMADIAN M.Hossein
BAHRAMI Susan
Medical university of Esfahan Iran, Islamic Republic Of

Contributed paper

Keywords: Health Care

Health sector as well as other sectors require to applicate needs assessment techniques .These techniques help planners to design health programs and projects relevant and applicable. Electronic communications such as e-mail survey can be useful and efficient to gathering and estimating the needs of clients specifically in broad geographical regions. One of the aims of this article is comparison between traditional and electronic techniques of needs assessment in field of health sector.

Paper-ID: 446

Surgical Care Providers' Participation into the Strategic Management Process

PAKDIL Fatma
Baskent University Turkey

Contributed paper

Keywords: Health Care, Human Resources Management, Strategic Planning and Management

Hospitals aiming at high performance should get their employees' ideas and use them effectively in strategic management process (SMP). A SMP including employees' ideas runs easier because employees are the only side who will apply outcomes of the SM. In this study, we tried to reveal current participation level of a surgical care providers group's into the SMP of the Medical Center and supposed some human resource management functions effecting the employees' participation level into the SMP.

Paper-ID: 1391

Modelling patient flows in a hospital using system dynamics

ARNALDOS-GARCIA Fuensanta
ARANDA-GALLEGO Joaquin
Universidad de Murcia Spain

Contributed paper

Keywords: Health Care, System Dynamics and Theory

In this paper we examine, using a system dynamics model, the implications over the activity of a hospital of the creation of three different units: a day surgery unit, a home health care unit and a day hospital unit. One of the most interesting consequences of those units is the implication over the waiting time to have access to health care. Although all of them can avoid the stay of some patients in the hospital, leaving room for patients who do really need it, the final consequences over the waiting time depend on the medical or surgical service considered.

Paper-ID: 1406

HEALTH RECORDS - PRIVACY, CONFIDENTIALITY AND THREATS

DRAKULIC Ratimir
DRAKULIC Mirjana
Faculty of organizational sciences Serbia and Montenegro

Contributed paper

Keywords: Health Care, Management Information Systems, Risk Analysis and Management

The paper introduces problem of trust in healthcare environment. Development and appliance medical information systems and e-health concept brought out problem of medical privacy, trust and security. Many questions came up regarding trust of all participants, how to gain trust and how to detain it. Trust assumes existence of imposed rights of some and obligations and responsibility of other subjects. Formed interaction is a matter of regulation in national laws, international organizations, medical associations and ethical codes. Fundamental thesis is the existence of this concept, but not the only one.

MD11, 16:00 – 17:30 — Executive Room Alpha
Timetabling II (C97)

Chair: CHAN Peter

Paper-ID: 937

Multi-Skilled Workforce Sizing and Management

CHAN Peter
EQUITIME S.A.

Contributed paper

Keywords: Strategic Planning and Management, Timetabling

Sizing a workforce and scheduling it to cater for legal conditions and provide special work arrangements have been receiving considerable by the scientific community and many methods have evolved. In this paper, we extend the method of Burns and Carter

1991, to calculate the size of multi-skilled workforces (which is different from hierarchical workforces). Here, we don't know who is working on which skill in calculating workforce size. Our method is to consider also all combinations of skills and not just one skill at a time to obtain various lower bounds.

Paper-ID: 846

A threshold accepting algorithm for the examination timetabling problem

PAPOUTSIS Kostas
Greece

TARANTILIS Christos
Athens University of Economics and Business Greece

Contributed paper

Keywords: Metaheuristics, Search Algorithms, Timetabling

The examination timetabling problem regards the assignment of a set of exams to specific time-slots respecting a set of hard constraints and attempting to satisfy a set of soft-constraints that are modelled using an objective function. It is well-known that this problem is highly combinatorial and it is very difficult to obtain solutions close to optimality. In this paper an on-going research on a threshold accepting heuristic is presented. Several types of local moves are used, however the proposed meta-heuristic has a remarkably simple structure and produces good solutions on a set of test problems.

Paper-ID: 1197

Planning, Mapping and Timetabling the Greek Coastal Marine Transportation

DIMOPOULOU Maria
HAINAS Costas
Athens University of Economics and Business Greece

Paper in an organized session

Keywords: Timetabling, Transportation and Logistics, EWG WATT Working Group on Automated Time Tabling

In this paper we plan and map the Greek Coastal Marine Transportation System (GCMTS). The GCMTS is among the largest systems in Europe due to the Greek peculiarity of 138 ports, which demand to be covered by means of marine transportation. The demand varies from one season to the other and is steadily grown over time both in passengers and vehicles. This system creates a unique problem of forecasting demand and of building a reliable timetable. We present a methodology for developing a timetable with stochastic demand and we develop a first step map and timetable.

Paper-ID: 1435

Assigning Cross-Trained Workers to Departments: An optimization Model to Maximize Utility and Skill Improvement

SAYIN Serpil
Koc University Turkey

KARABATI Selcuk
Contributed paper
Keywords: Multi-Objective Decision Making, Timetabling
We develop a general framework that is applicable in both manufacturing and service settings for assigning cross-trained workers across departments. The framework consists of a two-stage optimization model where two objective functions, departmental utility and skill improvement, are considered sequentially. Departmental utility is a function of departmental labor shortage and the first stage optimization model maximizes total departmental utility. The second stage model seeks to maximize total skill improvement, which is quantified by a hyperbolic learning curve, while trying not to deviate from the utility level obtained during the first stage optimization. Results of computational experiments are reported.

MD12, 16:00 – 17:30 **Executive Room Beta**
Non linear programming I (O36)

Chair: DUER Mirjam

Paper-ID: 173
Stability in convex semi-infinite optimization perturbing right-hand-side coefficients

TODOROV Maxim
Universidad de las Americas Mexico
GOMEZ Soraya
BUAP Mexico
Contributed paper
Keywords: Mathematical Programming, Programming, Linear, Programming, Nonlinear
We study parametric convex optimization problems, when only the right hand side in the side conditions is variable. We have characterized the interior of the set of convex semi-infinite optimization problems with non empty feasible set. We present some stability properties of the optimal set mapping. Various sufficient conditions, concerning the interior of the set of problems with non empty solution set have been given, as well .

Paper-ID: 1629
SVM Classification with Noisy Data:A Second Order Cone Programming Approach

TRAFALIS theodore
United States
Paper in an organized session
Keywords:, Programming, Nonlinear, Robust Optimization
In this paper, we investigate the stability of the linear programming Support Vector Machine (LP-SVM) solution with bounded noise in the input data using a robust optimization model. For a linear discriminant function, this model is expressed as a second order cone optimization problem. Using the concept of the kernel function we

generalize for nonlinear discriminant functions. Intuitively, it looks quite clear that large margin classifiers are robust in terms of bounded input noise. However, there is no theoretical analysis investigating this behavior. Preliminary experimental results are presented for toy and real world data.

Paper-ID: 1628

A Stochastic Approach to Fractional Programming

DUER Mirjam
Darmstadt University of Technology Germany

KHOMPATRAPORN Charoenchai
ZABINSKY Zelda B.
University of Washington United States

Paper in an organized session

Keywords: Global Optimization, Programming, Nonlinear

Maximization of functions involving ratios (like the sum or the product of ratios) appears in many economic and engineering situations, whenever the efficiency of a system is to be optimized. In this talk, we report on experience treating fractional problems with stochastic algorithms like Improving Hit-and-Run (IHR). The performance of IHR is for many problem classes comparable to existing algorithms, and it is more universal in the sense that it can treat many types of objective functions. We propose a strategy for stopping and restarting a stochastic algorithm and discuss benefits and drawbacks of both deterministic and stochastic solution approaches.

Paper-ID: 1631

An Integrated Approach for Solving Large Scale Global Optimization Problems

LOCATELLI Marco
GROSSO Andrea
Universitá di Torino Italy

SCHOEN Fabio
Universitá di Firenze Italy

Paper in an organized session

Keywords: Global Optimization, Programming, Nonlinear

A widely studied large scale global optimization problem consists in finding the global minimum energy configuration of a cluster of particles. This problem is important from the point of view of applications and is an ideal testbed for global optimization algorithms. We propose to extend a successful approach in order to incorporate a diversification strategy. The main result is the proposal of a general approach, which might be extended to different problems, in which local approximation, depth search and diversification, if properly designed with the inclusion of knowledge on the problem domain, cooperate to produce a robust and reliable algorithm.

MD13, 16:00 – 17:30 **Executive Room Gamma**
Location (C48)

Chair: KLAMROTH Kathrin

Paper-ID: 1027

A unified model for Weber problems with continuous and network distances

KLAMROTH Kathrin
University of Erlangen-Nuremberg Germany

PFEIFFER Barbara
Institute of Applied Mathematics Germany

Contributed paper

Keywords: Location, Mathematical Programming, Programming, Nonlinear

Continuous location problems and network location problems are generally viewed as completely different classes of problems. We will show that despite the classical distinction between continuous and discrete optimization, there are many similarities that can be exploited both for the development of new location models and for the derivation of theoretical properties and solution methods. This interrelation gives rise to a new line of research combining ideas from the fields of continuous and network location.

Paper-ID: 65

Using Integer Programming for Location Analysis of Wood Industry Plants, The Case of Iran

AZIZI Majid
Faculty of Natural Resources,University of Tehran Iran, Islamic Republic Of

Contributed paper

Keywords: Decision Theory and Analysis, Location, Programming, Integer

There is some limitation in field of wood resources in the country. We analysis plywood and veneer industry plants because of improper sites of the factories. In this regard the 48 cities in Iran were analyzed. For decision making of selection or non-selection of the cities, Integer Programming method has been used. Production of the units and wood raw material were used as objective function and limitation equation respectively. With regard to some limits in raw material, several of the cities have not been selected and deleted from the priorities. Among 48 cities, 8 cities could not be selected.

Paper-ID: 867

Continuous Single Facility Location with Probabilistic Weights

KUBOTA Junji
SUZUKI Tsutomu
University of Tsukuba Japan

Contributed paper

Keywords: Location

In Weber problem, we are given the location and the weight of each demand point, and we can uniquely decide the optimal facility location that minimizes average travel distance. However, when the weight of each demand is unknown prior to construction of a facility, decision makers must strategically decide a facility location by considering predictive accuracy of the weights. We assume the weights to be random variables and draw probability density distribution of the coordinates of minimum point. Then several decision criteria that include the minimization of maximum average regret are applied to a single facility location problem.

MD14, 16:00 – 17:30 — Executive Room Delta
Stochastic Models II (C88)

Chair: LOPEZ-HERRERO MJ

Paper-ID: 374

On inventories with repeated demands

LOPEZ-HERRERO MJ
Universidad Complutense de Madrid Spain

Contributed paper

Keywords: Production and Inventory Systems, Stochastic Models

An important feature in probabilistic inventory models is the specification of what happens when a demand occurs but the system is out of stock. Two cases are usually considered: (i) Lost-sales case. Unserved demands are lost. (ii) Backlog case. Unserved demands are backlogged and filled as soon as an adecuate replenishment arrives. The present study provides another alternative where any unserved demand, must leave the system temporary but some time later the demand is re-initiated. We approximate the inventory level steady-state distribution and investigate numerically the main performance measures and the optimal design of the replenishment parameters.

Paper-ID: 347

GRIM Scheduling Applications

PERCY David F.
University of Salford United Kingdom

Contributed paper

Keywords: Bayesian Statistics, Reliability, Stochastic Models

We present a class of models for describing the inter-failure times of complex repairable systems and illustrate the models on hypothetical data. Having identified potential benefits from this approach, we introduce a new class of Generalized Reduction of Intensity Models (GRIM), which allow for the inclusion of predictor variables. We discuss the properties of GRIM, comparing and contrasting them with other models for complex repairable systems. We also demonstrate GRIM on several sets of data from the oil industry, consider how to improve the analysis by specifying subjective prior distributions and so resolve the practical problem of scheduling preventive maintenance.

Paper-ID: 1001

MODELING, ANALYSIS AND PERFORMANCE EVALUATION OF A MANUFACTURING SYSTEM USING GENERALIZED STOCHASTIC PETRI NETS

EREN AKYOL Derya
TUNCEL Gonca
Dokuz Eylul University Turkey

Contributed paper

Keywords: Stochastic Models

Petri Nets are used for the performance evaluation of the modeled systems. Various performance measures can be evaluated using either analytical techniques, based on Markov processes or discrete event simulation. In this study, a manufacturing system is modeled by using Generalized Stochastic Petri Nets. Based on the reachability graph of the model, the equivalent Markov chain is obtained and solved by computing the steady state probabilities. After finding the steady state probabilities, we used our net to calculate some performance measures such as resource utilization, mean length of the queue, throughput rates of the transitions etc.

Paper-ID: 454

Autoregressive model within a mixing frame

DAHMANI Abdelnasser
AIT SAIDI Ahmed
TARI Megdouda
University of Bejaia Algeria

Contributed paper

Keywords: Economic Modeling, Stochastic Models, System Dynamics and Theory

This paper concerns the study of the parameter autoregressive processes when the error variable is valued under strong mixing assumption.

MD15, 16:00 – 17:30 — VIP Lounge
Telecommunication II (C104)

Chair: HARMANTZIS Fotios

Paper-ID: 704

A Pricing Model for GPRS Network with Wi-Fi Integration

HARMANTZIS Fotios
Stevens Institute of Technology, School of Technology Management United States

GUNASEKARAN Vinoth
YAIPAROJ Saravut
Stevens Institute of Technology United States

Contributed paper

Keywords: Economic Modeling, Mobile e-services, Telecommunications

Wi-Fi provides an excellent opportunity for the GSM/GPRS operators to enhance their data capability. By integrating both networks, operators are able to provide 3G-like

services. However, both networks have different data rates and capacity, which makes pricing a complicate issue. In this paper we propose a pricing model which identifies how pricing can play a significant role in improving the GPRS network performance and increase operators' overall revenue, when Wi-Fi is integrated with GPRS.

Paper-ID: 717

Study of the congestion for the dimensioning of a telephone network

ADJABI Smail
AISSANI Djamil
Laboratory LAMOS Algeria
HAMITI Djazira
ATMANI Taos Rosa
Algeria

Contributed paper

Keywords: Reliability, Telecommunications

In this work, we have studied the congestion problem of a switcher in a telephonic system in the objective of dimensioning some transmission canals of a network. The congestion in a telephonic system refers to the situation where the calls can't be treated directly for a lack of equipment. For the evaluation of congestion, we have considered the Erlang model with lost calls. The dimensioning policy consists of determining the number of lines to install and the limit number of users so that the probability of congestion in the network is lower than a specified probability threshold.

Paper-ID: 1340

Analyzing self-similarity in network traffic via the crossing tree

JONES Owen
University of Southampton United Kingdom
SHEN Yuan
University of Warwick United Kingdom

Contributed paper

Keywords: Telecommunications

By considering nested crossings made by a continuous process, we build a tree of crossings that encodes the sample path. From the crossing tree we obtain a test for self-similarity and an estimator for Hurst index H of a self-similar process. The performance of the estimator is validated by numerical experiments. A comparison study with three other estimators is also given. The estimator, combined with the self-similarity test, is employed to detect and quantify self-similarity in network packet traffic. We also investigate non-stationarity phenomena in network traffic, with respect to time variation of H.

Paper-ID: 1484

Minimum Energy Broadcasting Problem in Ad Hoc Wireless Networks

SALMAN Sibel
Koc University

ALTINKEMER Kemal
BELLUR Prashant
Purdue University United States

Contributed paper

Keywords: Graphs and Networks, Routing, Telecommunications

We consider the problem of efficient energy consumption in ad hoc wireless networks. At a given time point when the locations of all the nodes in the network are known, a source node initiates a broadcasting session. The problem is to find a set of relay nodes and the transmittal power magnitudes at these nodes such that the data packets originating at the source node reach every other node in the network with the use of minimum total energy. We propose an integer programming formulation and a Lagrangian relaxation based procedure.

MD16, 16:00 – 17:30 Syndicate Room A
Forestry Management II (C36)

Chair: CABALLERO Rafael

Paper-ID: 346

A FOREST PLANNING PROBLEM SOLVED BY A LINEAR FRACTIONAL GOAL PROGRAMMING MODEL

CABALLERO Rafael
GOMEZ TRINIDAD
HERNANDEZ Monica
University of Malaga Spain

LEON MARIA AMPARO
UNIV. PINAR DEL RIO Cuba

Contributed paper

Keywords: Forestry Management, Multi-Objective Decision Making, Natural Resources

In a Goal Programming problem with linear fractional criteria, the resulting problem is not easy to solve due to the non-linear constraints inherent to its formulation. This work introduces a simple and reliable test to establish whether a linear fractional goal problem has solutions that satisfy all the goals and, in the affirmative case, these solutions are found by solving a linear programming problem. This scheme has been contrasted through its application to a forest planning problem which made economics and ecological objectives compatible, with data provided by the Integral Forest Enterprise of Pinar del Rio (Cuba).

Paper-ID: 283

Clustering in forest management zone design with a tabu search algorithm

KRCMAR Emina
University of British Columbia Canada

MITROVIC-MINIC Snezana
Simon Fraser University Canada

VAN KOOTEN Cornelis
University of Victoria Canada
VERTINSKY Ilan
University of British Columbia

Contributed paper

Keywords: Combinatorial Optimization, Forestry Management

Increased conflicts between timber production and environmental protection led some analysts to advocate their spatial segregation. We refer to this land-use segregation as forest management zoning. Large non-fragmented forest reserves are ecologically desirable and larger clusters of timber production areas are considered economically efficient. An integer programming formulation of the forest management zone design problem will be presented that explicitly addresses clustering of both timber production and forest reserves. A tabu search algorithm is developed and implemented to several test problems. Performance of the algorithm for various clustering methods and problem sizes will be discussed.

Paper-ID: 626

Flushing analysis and ranking of european beech provenances in Croatia

JAZBEC Anamarija
EGOTIC Ksenija
Faculty of Forestry University of Zagreb Croatia
PERIC Sanja
IVANKOVIC Mladen
Forest Research Institute Croatia

Contributed paper

Keywords: Analytic Hierarchy Process, Forestry Management

A provenance experiment of European beech (Fagus sylvatica L.) was established in Croatia in 1998. Six provenances were selected. Flushing as a property of physiological character was monitored in 7 phenophases, which were recorded on 7 dates during the year 2000. Differences in entering phenophase 3 (indicating the very beginning of flushing, importance in determining resistance to late frosts), were analysed with the survival analysis. Flushing similarity was analysed with hierarchical and non-hierarchical cluster analysis. The provenances were ranked with AHP in order to select the most adaptable ones using the following criteria: survival, entering phenophase 3, mean height.

MD18, 16:00 – 17:30 **Jupiter Lobby**
Discussion Presentations III

Paper-ID: 974, MD18, 16:00-16:30, Panel #16

Multi-node serial supply chains: Investigation of inventory management policies

SKINTZI Georgia
Greece
IOANNOU George
PRASTACOS Gregory
Athens University of Economics and Business Greece

Discussion presentation paper

Keywords: Production and Inventory Systems, Supply Chain Management

In this paper we consider a serial supply chain which is bounded at its end by a POS with random demand. For the case of identical within-node processing times and inter-node transfer times, we derive analytical expressions of inventory levels under various replenishment policies. Furthermore, we show via simulation that the average inventory levels at all nodes of the supply chain equal the mean POS demand in steady state, if the latter is normally distributed. The results are illustrated through a comprehensive example. Finally, we propose ways of handling non-identical processing and transfer times.

Paper-ID: 1257, MD18, 16:00-16:30, Panel #25

Waiting time and the corresponding factors on reducing the delay in hospital elective procedure

KETABI Saeedeh
YARMOHAMMADIAN M.
TAVAKKOLI N.
MOTAGHEDMAND A.
AMINI M.
MEMARZADEH M.
University of Isfahan Iran, Islamic Republic Of

Discussion presentation paper

Keywords: Health Care, Queuing Systems, Simulation

One of the major issues in health care is waiting times to access services such as hospital care. In this research the whole process of admission-cure-discharge is investigated in an educational large hospital in Iran. The process may be formulated as a network of queues. Then, the factors that will influence on the delay in the process, are studied. It seems that the bottleneck in the process lies in the discharge process; from when the attendant issues the discharge permission until the patient leaves the hospital. At last some managerial decisions which reduce the delay are discussed.

Paper-ID: 1616, MD18, 16:00-16:30, Panel #43

Portfolio Management in a Stochastic Market

OZEKICI Suleyman
CELIKYURT Ugur
Koc University Turkey

Discussion presentation paper

Keywords: Financial Engineering, Risk Analysis and Management, Stochastic Models

We consider the portfolio selection problem in a stochastic market where the mean vector and covariance matrix of the returns of risky assets, as well as the risk-free return, all depend on the prevailing state of the market. We suppose that the market follows a Markov chain and use dynamic programming in order to analyze a number of mean-variance model formulations. Discussions focus on optimization of general and quadratic utility functions, the coefficient of variation and the safety-first approach.

Paper-ID: 722, MD18, 16:00-16:30, Panel #7

Extending outranking relations using data mining classification techniques

MASTROYANNIS Nikolaos
BOUTSINAS Basilis
GIANNIKOS Ioannis
University of Patras Greece

Discussion presentation paper

Keywords: Data Mining and Data Base Modeling Finance and Banking, Multi-Criteria Decision Aids

Multiple criteria decision making has been extensively used to solve classification problems. In this paper, a new methodology is proposed, that involves the combination of multiple criteria decision making and data mining techniques. In particular, the methodological framework of ELECTRE is extended, using a data mining classification algorithm. The concept of outranking relations and the use of concordance and veto thresholds, which are included in ELECTRE, enable the proposed algorithm to classify the proper alternatives to the predefined classes, effectively and accurately. Real world financial classification problems are used to test the robustness and efficiency of the proposed methodology.

Paper-ID: 989, MD18, 16:00-16:30, Panel #17

A methodology for assessing perceived website quality

LITOS Haralampos
MOUSTAKIS Vassilis
GRIGOROUDIS Evangelos
Technical University of Crete Greece

Discussion presentation paper

Keywords: Data Mining and Data Base Modeling, Multi-Criteria Decision Aids, Technology Management

The paper presents a methodological framework, which supports website quality assessment. The framework incorporates a hierarchical structure of a set of criteria, which provides a balanced account of website_s metrics and can be used to derive an overall website score. To validate the framework a wide experiment is conducted involving the assessment of three websites corresponding to the Greek cellular phone service providers. Statistical analysis techniques, machine learning, as well as ordinal regression analysis are used in order to analyse collected data. Such an endeavour would lead to the establishment a benchmarking system and link website assessment to customer satisfaction

Paper-ID: 843, MD18, 16:30 -17:00, Panel #35

A prototype architecture for a semantically enriched competence management system integrating e-learning capabilities

DRAGANIDIS Fotis
MENTZAS Gregoris
National Technical University of Athens, Greece

Contributed paper

Keywords: Knowledge Engineering and Management

In this paper, we claim that competence management and skills handling can provide a critical link for integrating knowledge management and e-learning efforts within knowledge intensive organizations. Specifically, the paper presents the architectural analysis of a semantically enriched, ontology-driven competence management system. The main issues discussed (1) the applications of competence and skills ontologies as enabling factors in knowledge intensive tasks and organizations; (2) the design parameters and design layers of the competence ontology and the overall system architecture; (3) the integration of e-learning and knowledge management functionalities within the competence management system.

Paper-ID: 729, MD18, 16:30-17:00 , Panel #8

A Survey on the Business Goals, the Investment on Technology and the Return of Investment on Greek E-commerce Systems

STEFANI Antonia
XENOS Michalis
Open Hellenic University Greece

MIHANETZIS Kostantinos
Hellenic e-Business Solution Ltd Greece

KAPOGIANNIS Giorgos
Messolonghi Technological Educational Institute Greece

Discussion presentation paper

Keywords: Management Information Systems, OR for Electronic Services

This paper presents a survey of Greek e-commerce systems. The study focuses on the technological infrastructure of e-commerce systems, their project managers' objectives (both short term and long term), and their opinion for the aid of e-commerce systems for the development of their business. The study involved 15 managers who were interviewed using a structured questions list controlled by the interviewee. The questions list focused on four main categories: CRM (Customer Relation Management), E-commerce technologies, User Interface and service and Return of Investment (RoI). The paper also discusses individual reasons based on each company's particularities and presents future goals.

Paper-ID: 997, MD18, 17:00-17:30, Panel #18

Airline Distribution Needs & The Changing Dynamics Of The Distribution Chain Within the Travel Industry.

PERSIDI VALLERA Avgi
Greece

DROSOS DIMITRIOS
GRADUATE TECHNOLOGICAL EDUCATION INSTITUTE OF PIRAEUS Greece

Discussion presentation paper

Keywords: Airline Applications, Management Information Systems

The rapid development of tourist supply and demand makes IT a significant and thus they increasingly play a more critical role in tourism marketing, distribution, promotion

and co-ordination. Information Technologies influence the strategic management and marketing of contemporary organizations as a paradigm shift is experienced transforming the best business practices glob. Recently in the tourism industry, there has been a race to introduce new technology. The general aim of this paper is to identify the potential benefits for tourism companies of the enhanced use of Information Technology (IT) and especially from the use of Global Distribution Systems (GDS's).

Paper-ID: 759, MD18, 17:00-17:30, Panel #9

Risk Assessment and Management with Respect to the Possibility-Probability

ZORAN Ciric
Serbia and Montenegro

SEDLAK Otilija
ECONOMIC FACULTY SUBOTICA Serbia and Montenegro

Discussion presentation paper

Keywords: Economic Modeling, Risk Analysis and Management, Strategic Planning and Management

This is a paper about different approach used to model risk, about probability risk analysis and fuzzy risk analysis. Using a probabilistic method, usually it is difficult to obtain precise relation between events and probabilities of occurrence. Fuzzy risk can be defined as an approximate representation to show risk with fuzzy theory. We develop the method to calculate the fuzzy risk with respect to the possibility-probability. The benefit of fuzzy risk assessment is that the new result can show more information when we use a fuzzy number to represent the expected value, saves more information for risk management.

Paper-ID: 1468, MD18, 16:00-16:30, Panel #34

A polling system with globally gated random order of service and dormant server. (N- policy)

THOMO Lida
University of Macedonia Greece

Discussion presentation paper

Keywords: Queuing Systems

We study a globally gated polling system, with a dormant server, which makes a halt at his home base when there are no customers present in the system until N customers arrived in the system. The service of the customers at every queue is random. We find the L.S.T. and the mean of the waiting time of a customer at a queue.

Tuesday, July 6

TA02, 9:00 – 10:30 **Delphi Amphitheater**
Scheduling: Parallel machines (C83)

Chair: SHAKHLEVICH Natalia

Paper-ID: 465
Scheduling jobs on uniform parallel machines with controllable processing times and preemption

SHAKHLEVICH Natalia
University of Leeds United Kingdom

STRUSEVICH Vitaly
University of Greenwich United Kingdom

Contributed paper

Keywords: Combinatorial Optimization, Mathematical Programming, Scheduling

We study a bi-criteria problem of preemptive scheduling the jobs on uniform parallel machines if the processing time of each job depends on the speed of the machine and on the amount of resources consumed by a job. To find a schedule, one has to assign the jobs to the machines, to sequence the jobs on each machine, to specify the resource consumption for each job and the corresponding job compression. The objective is to minimize the makespan of the schedule and the compression cost. We describe an algorithm that finds the breakpoints of the efficient frontier in polynomial time.

Paper-ID: 1380
Parallel Machine Scheduling with Lot Splitting and Sequence Setups

ROMANIN-JACUR Giorgio
FILIPPI Carlo
University of Padova Italy

Contributed paper

Keywords: Production and Inventory Systems, Scheduling

Consider large lots of identical items, to be scheduled on non identical parallel machines. Every lot may be continuously split into fractions to be processed, also simultaneously, on different machines. Every lot change on a machine requires a comparatively large sequence dependent setup time. A release time and a due date are associated with each lot. The problem is to allocate lot fractions to machines and sequence them, minimizing the total weighed tardiness. The problem is proved to be NP-hard, therefore a suitable local search algorithm is proposed and tested on actual size instances.

Paper-ID: 1225
RESCHEDULING IN UNRELATED PARALLEL MACHINE ENVIRONMENTS

OZLEN Melih
Middle East Technical University Turkey

AZIZOGLU Meral
Faculty of Engineering Turkey

Contributed paper

Keywords: Mathematical Programming, Multi-Objective Decision Making, Scheduling

In this study, we consider a rescheduling problem in unrelated parallel machine environments. We use total flow time as an efficiency measure and the number of jobs assigned to different machines in initial and new schedules as a stability measure. We aim to generate all efficient solutions with respect to efficiency and stability measures. We show that some special efficient solutions can be generated in polynomial time and propose an LP-relaxation based approximation algorithm to generate all efficient solutions. Our experimental results have revealed that the algorithm returns exact efficient solutions for the majority of the test problems.

TA03, 9:00 – 10:30 **Athena**

Combinatorial Optimization: Set Partitioning (C10)

Chair: KRARUP Jakob

Paper-ID: 1183

A family of structured set covering problems

KRARUP Jakob
University of Copenhagen Denmark

VILLADSEN John
The Technical University of Denmark Denmark

Contributed paper

Keywords: Combinatorial Optimization

An assignment, essentially a highly structured instance of Unweighted SET COVER, was published in 2003. For given n, the instance P(n) is a square matrix of size n^3. Let r(n) be the number of columns solving P(n). Upon 72 hours CPU- time, CPLEX returned correctly r(5)=12. The original assignment asks for r(12), an optimal solution to a square matrix of size 531,441. Using an invalid argument, the originator of the assignment announced his own answer, r(12)= 512, and cashed the the award. We show that r(12) belongs to the interval [210,377] and conjecture that the lower bound is tight.

Paper-ID: 610

Benders Decomposition for the Multidimensional Quadratic 0-1 Knapsack Problem

DREXL Andreas
KNOF Diether
Christian-Albrechts-Universität zu Kiel Germany

Contributed paper

Keywords: Combinatorial Optimization

The multidimensional quadratic 0-1 knapsack problem (MQKP) consists of selecting items among a given set such that a quadratic objective function is maximized subject to knapsack constraints. The MKQP is very hard to solve because it contains the well-known NP-hard MKP and QKP as special cases. Benders decomposition is applied to a

mixed-integer linear programming reformulation of the quadratic 0-1 program. Computational results are presented for a set of small hard instances generated randomly. The algorithm is very general in the sense that it does not require the coefficients to be nonnegative, a usual assumption for MKP and QKP.

Paper-ID: 1350

SOLVING THE SET PARTITIONING PROBLEM USING LAGRANGEAN RELAXATION AND COLUMN GENERATION

BOSCHETTI Marco
MINGOZZI Aristide
University of Bologna Italy

RICCIARDELLI Salvatore
Universitá di Roma 'Tor Vergata' Italy

Contributed paper

Keywords: Combinatorial Optimization, Mathematical Programming, Programming, Linear

In this paper we propose a new dual heuristic and an exact method for the set partitioning problem (SP). The dual heuristic combines Lagrangean relaxation and column generation and uses subgradient optimization to find an effective dual solution of the LP-relaxation. This procedure is faster than traditional simplex based methods, moreover, we show that the lower bound achieved dominates the classic Lagrangean relaxation of the SP constraints. The exact method iteratively solves a sequence of reduced SPs using a general purpose integer programming solver. Our results indicate that the new bounding procedure is fast and produces very good dual solutions.

Paper-ID: 1491

SDP relaxation for the Quadratic Assignment Problem

LISSER Abdel
BENAJAM Wadie
MINOUX Michel
Universite de Paris Sud France

Contributed paper

Keywords: Combinatorial Optimization, Mathematical Programming

We propose a cutting plane algorithm based on SDP relaxation for solving the quadratic assignment problem. We test different inequalities such that nonnegative inequalities, triangle inequlities,... Numerical results on qaplib medium size instances are given. Comparisons with the state of the art bounds are also presented.

TA04, 9:00 – 10:30 **Salon des Roses A**

Multicriteria Decision Aid: Applications in e-business (C58)

Chair: MONTMAIN Jacky

Paper-ID: 576

A cybernetic modeling of a multi-criteria decision process in organization

MONTMAIN Jacky
French Atomic Commission

MAURIS Gilles
LISTIC France

KHARRAZ Abdellah
site EERIE-EMA France

Contributed paper

Keywords: Decision Support Systems, Management Information Systems, Multi-Criteria Decision Aids

The technical function of a knowledge dynamical management system (KDMS) is to manage and control the evolution of the knowledge corpus produced by an organization in the framework of project. Based on the KDMS, this paper explains how to design collective evaluation aids and traceability functions for strategic decisions and logical argumentation. The management of a collective project is thus represented as a control loop where the risk accompanying the decisions is the controlled variable and is strongly linked to the entropy of the knowledge base managed by the KDMS.

Paper-ID: 74

Optimal Choice Models Fast Implementation in Advanced E-business Applications

RESTEANU Cornel
National Institute for R&D in Informatics Romania

Contributed paper

Keywords: Multi-Criteria Decision Aids, OR for Electronic Services, Web-based information systems

The paper presents an OR and AI software for advanced e-business applications development. OPTCHOICE is a package consisting of three software: a product capable to define and solve, in remote regime, using the Internet, Multi-Attribute Decision Making problems, a technology to enclose, in e-business applications, the ready-made modules for optimal choice of a decisional variant, and finally, a library containing applying samples. The MADM model is general, more than one decidents and states of nature, and the attributes can be of cardinal, ordinal, Boolean and fuzzy type. The knowledge-based computing avoids model inconsistency. There are 10 solving methods.

Paper-ID: 561

THE USE OF MULTICRITERIO DECISION AID SYSTEM IN THE INFORMATION TECHNOLOGY (IT) ALLOCATION PROBLEM.

ESCOBAR-TOLEDO Carlos
LOPEZ GARCIA Baruch
National University of Mexico (UNAM) Mexico

Contributed paper

Keywords: Analytic Hierarchy Process, Mathematical Programming, Multi-Criteria Decision Aids

Managers should know how to allocate information technology in their organizations. Multicriterio methods can be used to analyze decisions that deal with this problem. Some criteria as strategic importance, cost operations and industry competition environment should be considered. This paper provides the use of systemic approach to reduce the high level of uncertainty prevalent in this type of decisions; thus, we use multicriterio aid decision making to solve this complex problem. Using also mathematical programming (0,1), having as input conditions those resulting from the multicriterio results, it is possible to allocate easier the different strategic services into organization's IT structure.

Paper-ID: 658

Intelligent Agent Negotiation Strategies in the Electronic Marketplace Environment

LOUTA Malamati
ROUSSAKI Ioanna
National Technical University of Athens Greece

PECHLIVANOS Lambros
Athens University of Economics and Business Greece

Contributed paper

Keywords: Decision Support Systems, Distributed Artificial Intelligence and Multi-Agent Systems, Group Decision Making and Negotiation

E-commerce will dominate the market if coupled with appropriate technologies and mechanisms. Mobile agents may enhance the intelligence and improve the efficiency of systems in the e-marketplace. We propose a dynamic multilateral negotiation model and construct efficient negotiation strategies based on ranking mechanisms that do not require a complicated rationale on behalf of the buyer agents. These strategies can be used to extend the functionality of autonomous agents, so that they quickly reach to an agreement aiming to maximise their owner_s utility. The framework considers both contract and decision issues, is based on real market conditions, and has been evaluated.

TA05, 9:00 – 10:30 **Salon des Roses B**

EWG ESIGMA: Value Measurement and Decision Conferencing (O28)

Chair: STEWART Theo

Paper-ID: 1267

Formulating Problems in Decision Conferences

PAPAMICHAIL K. Nadia
FRENCH Simon
SNOWDON Bob
University of Manchester United Kingdom

YANG Jian-Bo
UMIST United Kingdom

Paper in an organized session

Keywords:, EWG ESIGMA Special interest group on Multicriteria Analysis, EWG Group Decision and Negotiation Support, EWG HCP Human Centered Processes

Decision conferences are facilitated workshops that help a group of decision makers gain a shared understanding of a decision problem and commit to an action plan. This work seeks to identify best practice in the facilitation of the early problem formulation stage of decision conferences. Video material of simulated decision conferences based upon the same hypothetical scenario but facilitated by a different person has been analysed using the facilities of CAMaR (Centre for Applied Management Research, University of Manchester). The purpose-built facilities allowed us to observe group decision processes in a controlled environment. The findings of the study are presented.

Paper-ID: 1169

Comparing Even Swaps and MAVT

BELTON Valerie
University of Strathclyde United Kingdom

MONTIBELLER Gilberto
Kingston Business School, Kingston University United Kingdom

WRIGHT george
Durham University

Paper in an organized session

Keywords: EWG ESIGMA Special interest group on Multicriteria Analysis

The value function approach to MAVT is widely taught and well used in practice. Nevertheless, it is our experience that both students and decision makers often face problems in fully appreciating the meaning and significance of criteria weights. Thus, the Even Swaps Approach, proposed by Hammond, Keeney and Raiffa in 1998, is an interesting alternative as it does not utilise criteria weights. But how is viewed by decision makers? In this paper we report on studies, involving over 200 MBA students, to explore their perceptions of the ease of use and relative strengths and weaknesses of the two approaches.

Paper-ID: 1143

From verbal judgements to numerical scales: Comparing MACBETH to AHP

VANSNICK Jean-Claude
University of Mons-Hainaut Belgium

BANA E COSTA Carlos
Centreof Management Studies & LSE Department of Operational Research Portugal

DE CORTE Jean-Marie
University of Mons-Hainaut Belgium

Paper in an organized session

Keywords: EWG ESIGMA Special interest group on Multicriteria Analysis

The aim of this talk is to present the main differences between two of the approaches used to convert verbal judgements into a cardinal scale (interval or ratio scale), namely the MACBETH and the AHP approaches. For this purpose we will discuss their questioning procedures, the mathematical tools used and their consistency tests.

Paper-ID: 1489

Measuring Performance in the Customs and Excise Department

BELTON Valerie
SANTOS Sergio
HOWICK Susan
University of Strathclyde United Kingdom

PILKINGTON Martin
HM Customs and Excise United Kingdom

Contributed paper

Keywords: Data Envelopment Analysis, Multi-Criteria Decision Aids, System Dynamics and Theory

In this paper we describe the process of development and implementation of a system for the evaluation of the performance of the regions of the Business and Taxes Directorate of the UK Civil Service Department, HM Customs and Excise. In particular we highlight the benefits derived from the use of qualitative system dynamics to identify performance measures and of a multicriteria framework based on the principles of DEA to compare the performances of regions and to identify best practice.

TA06, 9:00 – 10:30 — Nafsica A

Supply Chain Management IV (O15)

Chair: PATRIZI Giacomo

Paper-ID: 1649

Nonconvex Network Flow Problems in Supply Chain Management

PARDALOS Panos
United States

MYGDALAS Athanasios
Technical University of Crete Greece

Paper in an organized session

Keywords: Facilities Planning and Design, Network Design, Supply Chain Management

Many problems of design and analysis of large systems can be formulated and solved using techniques of nonconvex network theory. , Such problems include transportation, production-inventory, distribution, supply chain, logistics, scheduling of industrial processes and communication network design problems. In this talk we present recent applications in supply chain management and computational approaches for solving large-scale minimum concave cost optimization problems. In particular we consider Fixed Charge and Concave Piecewise Linear Network Flow Problems

Paper-ID: 256

Stochastic models for Supply Chain Management under uncertainty

ESCUDERO Laureano Fernando
Universidad Miguel Hernandez Spain

ALONSO AYUSO Antonio
Universidad Rey Juan Carlos Spain

ORTUNO M. Teresa
Universidad Complutense de Madrid Spain

Paper in an organized session

Keywords: Stochastic Models, Supply Chain Management

We present a set of models for the Supply Chain Management, where uncertain parameters are the product price and demand, raw material supply cost, and production cost over a time horizon. A scenario tree is used to represent the uncertainty. Problems are modelled by splitting variable representations of the Deterministic Equivalent Model of the stochastic problem. Two different objectives are considered in the two-stages 0-1 mixed models: minimization of the expected cost and the reaching (or excess) probability, as a risk measure. The Branch-and Fix Coordination algorithmic approach is presented. Some computational experience are reported.

Paper-ID: 1234

Combining Mixed Integer Programming and Constraint Programming for Solving Complex Supply Chain Planning and Scheduling Problems

VAZACOPOULOS Alkis
Dash Optimization United States

Contributed paper

Keywords: Combinatorial Optimization, Mathematical Programming, Supply Chain Management

In this talk we will examine the results of a three year EU funded R&D project in large-scale integrated supply chain optimization. The objective of the project was to use mixed-integer programming (MIP) and constraint programming (CP) to address the combined planning and scheduling problem that arises in supply chain planning and optimization. The project has two main results that will be discussed: firstly a unified achitecture (one system/one model) has been found that works well for the planning and scheduling problem and secondly this architecture has been applied to several real-world problems.

Paper-ID: 1187

Optimal Management of Dynamical Multi-modal Supply Chain Systems

DI GIACOMO laura
Italy

PATRIZI Giacomo
University of Rome "La Sapienza" Italy

Paper in an organized session

Keywords: Programming, Nonlinear, Supply Chain Management, Transportation and Logistics

Nonlinear, stochastic, dynamic representations of supply chain management seem better suited to solve complex multistage and multi-modal supply problems which arise within the Common Market. Raw materials must be processed, transported through multi-modal systems (sea, river, tyre and rail) to producing plants and appropriately distributed through multi-modal vectors, efficently. The ensuing problem results in a complex multistage multi-modal supply chain problem, which must be solved, requiring efficent management at all levels of the chain. The aim of this paper is to present such an algorithm, prove its convergence and show how optimal and feasible solutions can be derived.

TA07, 9:00 – 10:30 **Nefeli B**

Data Envelopment Analysis IV (C18)

Chair: VICENTE Maria Rosalia

Paper-ID: 348

Research and Development in the European Union: a DEA approach

VICENTE Maria Rosalia
QUINDOS Maria del Pilar
RUBIERA Fernando
University of Oviedo Spain

Contributed paper

Keywords: Data Envelopment Analysis, Innovation, Research and Development

At the Lisbon Summit in March 2000, European heads of state and government set a clear strategic objective for the European Union (EU): to become the most competitive knowledge-based society in the world by 2010. In this context the aim of this paper is the analysis of the creation of knowledge in EU. To approach knowledge creation we have used input and output indicators of research and development (R&D) activities. Over these indicators we have applied an efficiency analysis by means of DEA methodology for EU-15.

Paper-ID: 11

Efficiency based on the difference between weighted output and weighted input with bounds on the weights

FRIEDMAN Lea
ben gurion university Israel

HADAD Yossi
Negev Academic College of Engineering Israel

SINUANY STERN Zilla
ariel college of juda and samara Israel

Contributed paper

Keywords: Data Envelopment Analysis, Multi-Criteria Decision Aids

The DEA model is a ratio between the outputs to the inputs, thus it is not a linear model. The transformation into a linear one is by maximizing the outputs and adding the constraint that normalized the inputs to 1. The normalized constraint may cause infeasible solution to the DEA model, when there are bounds on the weights. We suggest another DEA version, which is based on the difference between the outputs to the inputs. The main change is to omit the normalization constraint. This method provides feasible solution for any bounds and guarantees maximal efficiency to the unit self-evaluation

Paper-ID: 167

Performance evaluation of R&D institutions

OZPEYNIRCI Ozgur
Turkey
KOKSALAN Murat

Contributed paper

Keywords: Data Envelopment Analysis, Research and Development

Data Envelopment Analysis (DEA) assigns efficiency values to decision making units (DMU) in a given period by comparing the outputs with inputs. In many applications, outputs and inputs of DMUs are monitored over time. Inputs may be converted to outputs with a time lag. We develop an approach that tries to capture the time lag between the outputs and inputs in assigning the efficiency values to DMUs. We present computational results on randomly generated problems as well as on an application to R&D institutions of the Scientific and Technical Research Counsel of Turkey.

Paper-ID: 301

REAL ESTATE PERFORMANCE ATTRIBUTION: A PRODUCTIVITY ANALYSIS APPROACH

KOUTROUMPIS SOKRATIS
MARKELLOS Raphael
Athens University of Economics & Business Greece

Contributed paper

Keywords: Data Envelopment Analysis, Location, Telecommunications

This paper explores a framework for corporate real estate asset performance attribution and planning based on productivity analysis. The traditional approaches are ad hoc benchmarking procedures utilizing comparative ratio analysis. We argue that productivity analysis is advantageous with a rigid theoretical basis, a far more consistent methodology which offers rich positive and normative interpretation. Moreover, productivity analysis allows the analysis and attribution of real estate performance across various dimensions and objectives such as cost, profit and production. We demonstrate the practical significance of the proposed framework in evaluating the comparative performance of real estate portfolio components for the Greek Telecommunications Organization.

Parallel Sessions

Tuesday, July 6

TA08, 9:00 – 10:30 **Nafsica B**
Meta-Heuristics II (C55)

Chair: SOUBEIGA Eric

Paper-ID: 737
A comparative study of hyperheuristic techniques
SOUBEIGA Eric
BURKE Edmund
University of Nottingham United Kingdom

Contributed paper

Keywords: Metaheuristics, Scheduling, Search Algorithms

We report a comparative study of various hyperheuristics. Hyperheuristics are heuristics that choose between heuristics. One key ingredient for the effectiveness of such approaches is the learning mechanism which helps the hyperheuristic select a "good" heuristic at each decision point. The decision problem of the hyperheuristic is equivalent to carrying out a search in the heuristic space. In this work we investigate two hyperheuristics which use two different search methods in the heuristic space: tabu search and simulated annealing. The resulting tabu-search and simulated-annealing hyperheuristics are applied to a number of scheduling problems in order to assess their respective performance.

Paper-ID: 765
Tradeoffs Programming - A New Class of Heuristics
MASIN Michael
Israel

HERER Yale
Technion —- Israel Institute of Technology Israel

Contributed paper

Keywords: Combinatorial Optimization, Metaheuristics, Multi-Objective Decision Making

We propose new heuristic optimization technique for combinatorial problems called TradeOffs Programming (TOP). TOP is similar to multiobjective Dynamic Programming, though it can handle inseparable problems. If we can find performance measures for the subsystems which tend to determine the performance of the whole system, then we can decompose the whole system using these performance measures. TOP is quick and accurate. We examine four different problems, each showing a different way in which the TOP framework can be used: starting from production control and inventory systems, continuing through system design and "total profit" models and finishing with classical combinatorial problems.

Paper-ID: 788
A Tabu Search Algorithm for the Orienteering Problem
KILINC Fatma
Turkey

Contributed paper

Keywords: Combinatorial Optimization, Metaheuristics Routing

This study presents a tabu search algorithm to solve the orienteering problem, a variant of the generalized traveling salesman problem. Orienteering problem is concerned with finding a path between a set of control points, among which start and end points are specified. Main aim is to maximize the total score collected subject to time constraint. A tabu search algorithm with 4 move operators and recency-based memory is used. Tabu list size is determined based on problem specific information. Algorithm is tested with problems from the literature and its performance is evaluated against problem specific heuristics, meta-heuristics and the optimal results.

TA09, 9:00 – 10:30 **Jupiter (small)**

Financial Engineering III (C31)

Chair: BEASLEY J E

Paper-ID: 1640

An evaluation of passive strategies to beat the index

BEASLEY J E
United Kingdom

Contributed paper

Keywords: Financial Engineering, Metaheuristics

In this paper we consider the problem of choosing a stock portfolio so as to exceed the return on an index - enhanced indexation. We present a number of different objectives that can be adopted when designing such a portfolio and investigate these varying objectives computationally using data drawn from several national markets. The conclusions from our computational investigation are that whilst for some objectives and some market indices enhanced indexation would have been unprofitable there are objectives and market indices where it would (historically) have been profitable. These indices are the Hang Seng, the FTSE 100 and the S&P500.

Paper-ID: 770

A Simple Interest-Rate Model with Bilateral Jumps

KIJIMA Masaaki
Kyoto University Japan

KOMORIBAYASHI Katsuya
Mizuho-Daiichi Financial Technology Japan

Contributed paper

Keywords: Financial Engineering, Financial Modelling

In this paper, we propose a simple yet useful spot-interest rate model with bilateral jumps. Discount bond prices are derived in closed form. As in the Hull-White model, our model is consistent with the current term structure observed in the market, if the time-dependent drift is appropriately chosen. The other parameters in our model are estimated by the ordinary likelihood method. Some numerical examples are given to demonstrate the usefulness of our model.

Paper-ID: 792

Investment volatility: A simple alternative to beta

TOFALLIS Chris
University of Hertfordshire United Kingdom

Contributed paper

Keywords: Finance and Banking, Financial Engineering, Financial Modelling

In the field on investments, beta is widely used as a measure of the volatility of an investment relative to market volatility. We argue that the standard method of estimating beta (using least squares regression) is inappropriate for a number of reasons. We present an even simpler approach which is easier to interpret and gives results which are intuitively more acceptable. An illustration using the stocks on the Dow Jones Index places them in a different rank order of volatility and generally shows them to be riskier than the indication given by standard beta.

TA10, 9:00 – 10:30 — Nefeli A

OR for electronic services I (O30)

Chair: VRECHOPOULOS Adam

Paper-ID: 1508

Mobile Technology vs. Service Acceptance Models

CARLSSON Christer
WALDEN Pirkko
Abo Akademi University Finland

Contributed paper

Keywords: Mobile e-services, Multi-Objective Decision Making, Strategic Planning and Management

The work with and the discussion of value propositions and acceptance models for mobile technologies and services are now a key issue. We will use findings from a series of consumer and expert studies carried out by IAMSR in Finland in 2001-2003 to test the proposal that technology acceptance models (TAM, UTAUT) and service acceptance models are inconsistent in their predictions of how innovations on mobile technology and applications built on them will be accepted by prospective users. This appears to be one key reason why the predictions of a breakthrough for mobile ser-vices have failed repeatedly in recent years.

Paper-ID: 1513

Value Propositions for Mobile Services

WALDEN Pirkko
CARLSSON Christer
Abo Akademi University Finland

Contributed paper

Keywords: Mobile e-services

Mostly technologies and markets grow in tandem, and the development of the mobile markets will be evolutionary, i.e. new products and services will have a basis in the

existing mobile products and services. Another common wisdom is that multimedia services will drive the acceptance of the new mobile technology. We will draw upon a series of consumer and expert surveys carried out by IAMSR in Finland in 2001-2003 to show the acceptance of mobile technology applications. The results are used to propose some changes to the UTAUT model in order to explain the user acceptance of mobile technology.

Paper-ID: 887

Customer satisfaction in mobile context-aware commerce

TSAMAKOS Argirios
Greece

Paper in an organized session

Keywords: Marketing, Mobile e-services, OR for Electronic Services

Mobile commerce has experienced growth during the past years and continues to evolve. We define as mobile context-aware commerce any transaction of monetary value, occurring between two entities, conducted over mobile communication networks and taking into account customer_s context and offering relevant services. In our research we propose a model to measure customer mobile-experience and satisfaction from this type of services. To this end, we combine Marketing and consumer behaviour with Human-Computer Interaction (HCI) taking into account experience and satisfaction measurements in the traditional and electronic environment along with the specific characteristics and attributes of the new channel, mobile communications.

Paper-ID: 618

Mobile Internet Services Usage Patterns: Evidence from the Emerging Hellenic Market

VLACHOS Pavlos
ELTRUN Greece
VRECHOPOULOS Adam
GIAGLIS George
Athens University of Economics & Business Greece

Paper in an organized session

Keywords: Mobile e-services, On line Market Research, OR for Electronic Services

Mobile voice services in Europe are fast reaching saturation. Wireless network operators in their effort to recoup huge investments made for acquiring 3G licenses and developing the corresponding infrastructure, enagoniously try to develop innovative services that will be perceived as valuable from consumers. To do so they are in need of knowledge regarding mobile internet services usage patterns. Using a large-scale online survey the authors conclude that the usage of mobile internet services in Greece is still at its infancy while pricing methods and the level of charges are of great importance.

TA11, 9:00 – 10:30 **Executive Room Alpha**
Airline Applications I (C01)

Chair: THIEL Markus P.

Paper-ID: 680
Solution Methods for Team-oriented Airline Crew Rostering

THIEL Markus P.
GUO Yufeng
Decision Support & OR Lab Germany

Contributed paper

Keywords: Airline Applications, Scheduling

The Airline Crew Scheduling Problem (CSP) usually consists of two consecutive steps: Pairing generation and assignment (or rostering). Due to high cost pressure, significant progress was achieved with regard to pure cost minimization, sometimes at the expense of crew members. Therefore, we introduce a specific mathematical model, its extensions, and solution approaches to handle the crew rostering with greater emphasis on crew satisfaction, namely the minimization of crew changes over the planning period. All models and results are based on the rostering setting of a European tourist airline with multiple home bases and time-dependent crew availabilities.

Paper-ID: 461
Daily Operational Flight Schedule

NEDELJKOVIC Slavica
JAKIMOVSKA Vera
BABIC Obrad
Faculty of Transport and Traffic Engineering Serbia and Montenegro

CANGALOVIC Mirjana
Faculty of Organizational Sciences, University of Belgrade Serbia and Montenegro

Contributed paper

Keywords: Airline Applications, Decision Support Systems, Scheduling

The Daily Operational Flight Schedule (DOFS) is defined by dispatcher in an Airline Operational Control Center in the cases when it is not possible to realize planned flight schedule due to the schedule perturbation. Perturbation can be caused by technical, meteorological, crew reasons, etc. In this paper DOFS problem is mathematically modeled and due to the fact that the problem is NP hard, heuristic algorithm and appropriate software for its solving was developed. Proposed solution of this problem is illustrated by an numerical example considering real life problem.

Paper-ID: 686

A Genetic Algorithm based Integrated Approach for Airline Crew Schedule Recovery

GUO Yufeng
THIEL Markus P.
Decision Support & OR Lab Germany

Contributed paper

Keywords: Airline Applications, Scheduling

Airline crew schedules are rarely operated as planned, because of irregular events during day-to-day operation, such as aircraft mechanical problems, severe weather condition, crew unavailability, and air congestion. Therefore, the main task of rescheduling is to recover the disrupted schedules as much and quickly as possible. In this article, we propose a Genetic Algorithm (GA) based heuristic approach, in which rescheduling disrupted flights is conducted in the course of an evolutionary process. Computational results tested with real-life data from a European airline are also presented.

TA12, 9:00 – 10:30 **Executive Room Beta**

Global optimization (C39)

Chair: OZDEN Mufit

Paper-ID: 978

Probability Distribution based Global Optimization Algorithm for Continuous Decisions

OZDEN Mufit
Miami University United States

Contributed paper

Keywords: Global Optimization, Robust Optimization, Search Algorithms

This paper studies the efficiency and robustness of a new optimization algorithm with the well-known hard test problems, such as the Rosenbrock, Rastrigin, and Griewank functions. The algorithm belongs to the class of the evolutionary algorithms. It evolves a probability distribution defined over the decision space rather than a discrete population of solutions as customary with the Genetic Algorithms. We will present comparative results.

Paper-ID: 218

Models of Information Uncertainty in Global Optimization Tasks

PODOBEDOV Vitaly
Russian Federation

Contributed paper

Keywords: Global Optimization

Methods of evaluating an influence of information uncertainty to the errors of global optimization algorithms are considered. Uncertainty models include the cases when the information about an optimizing function is calculated with an uncertain error or with

random error with an unknown probability distribution. Uncertainties occurring due to deterministic chaos and a great variety of components of an analyzing system are also considered. Artificial introducing of uncertainty as useful means for enhancing an efficiency and convergence of the algorithms is proposed.

Paper-ID: 1315

A unifying approach to entropy-like multiplier methods

KOMAROMI Eva
Budapest University of Economics and Public Administration Hungary

Contributed paper

Keywords: Global Optimization, Mathematical Programming, Programming, Nonlinear

Entropy-like multiplier methods solve convex constrained minimization problems by solving their dual. To regularize optimization process a distance-like function parametrized by the current estimate of the Lagrangian multipliers is added to the Lagrangian of the problem, to enforce positivity of these multipliers the chosen distance-like function is defined on the positive orthant. We are concerned with extending available convergence results without specifying any concrete appearance for the distance-like function, and with identifying those distance-like functions under the application of which global convergence of the sequence of the dual estimates to an optimal dual solution is guaranteed.

TA13, 9:00 – 10:30 **Executive Room Gamma**

Freight transportation and vehicle routing (C101)

Chair: FLEISCHMANN Bernhard

Paper-ID: 1516

The dynamic single-load pickup-and-delivery problem

FLEISCHMANN Bernhard
Universität Augsburg Germany

Contributed paper

Keywords: Routing, Transportation and Logistics

Transport orders arriving at random are to be dispatched on-line to a fleet of vehicles, each with the capacity for a single order. Objectives are minimal time window violations and shortest empty moves. In an earlier case study, this problem with, additionally, dynamic travel times was investigated, and three approaches were compared: Simple dispatching rules, various insertion algorithms and an assignment algorithm, where the latter turned out to be clearly dominant. In a recent computational study, this comparison is ex-tended to more general situations, based on a test bed for generating problem data with constant travel times.

Paper-ID: 1414

Service Optimization for Small Container Coastal Freight Shipping With Short-Run Stategies and Variable Fleet Size

KARLAFTIS Matthew
National Technical University of Athens Greece

SAMBRACOS Evangelos
University of Piraeus Greece

Contributed paper

Keywords: Artificial Intelligence, ES and Neural Networks, Supply Chain Management, Transportation and Logistics

A genetic algorithm based model for intermediate-level planning for Fleets of Small Container Coastal Freighters is developed. Service patterns over different operation periods that include short-run strategies and variable freighter sizes, are considered, for jointly obtaining optimal service levels and freighter types, given demand, resource and travel time constraints. The model is incorporated into a user-friendly MS-EXCEL based interface and an application to the Aegean cargo shipping network is examined.

Paper-ID: 1434

An Integrated Scheduling Method for the Container Handling Systems in a Maritime Terminal

CHEN Lu
France

BOSTEL Nathalie
IUT de Saint Nazaire de l'Université de Nantes France

DEJAX Pierre
Ecole des Mines de Nantes

CAI Jianguo
XI Lifeng
Shanghai Jiao Tong University China

Contributed paper

Keywords: Scheduling, Transportation and Logistics

In this paper we present an integrated model to schedule different types of equipment in a container terminal. The problem is formulated as a Flexible Job Shop Scheduling problem with precedence and blocking constraints (FJSS-B). We introduce an extended version of the disjunctive graph to represent the problem. This problem is NP-hard, therefore two major types of heuristics are developed. Job-by-Job heuristics schedule one job across all the stage at a time; while Multiple Insertion Heuristics attempt to schedule all jobs in each stage in turn. The effectiveness of the heuristics is analyzed from the computational point of view.

Paper-ID: 1572

Optimal shipping strategies for n transport alternatives

DULLAERT Wout
MAES Bart
VERNIMMEN Bert
University of Antwerp Belgium

WITLOX Frank
University of Ghent Belgium

Paper in an organized session

Keywords: Metaheuristics, Transportation and Logistics

The inventory-theoretic approach to modal choice is used to determine the optimal mix of transport alternatives when goods are shipped from a supplier to a receiver. The optimal mix of transport alternatives refers to that particular combination of transport alternatives that results in the lowest total logistics costs for the receiver. These costs comprise order costs, transportation costs and inventory costs. In a first step to explore the use of metaheuristics for optimization problems like these, a simple Evolutionary Algorithm is developed.

TA14, 9:00 – 10:30 **Executive Room Delta**

Knowledge Engineering and Management (C45)

Chair: KASCELAN Ljiljana

Paper-ID: 269

An Application of Data Mining Techniques for Financial Crisis Causes Discovering

KASCELAN Ljiljana
Faculty of Economics Serbia and Montenegro

Contributed paper

Keywords: Data Mining and Data Base Modeling, Decision Support Systems

Issue of recovering and restructuring of enterprises which have a loss and bad financial condition, is very actual in our region. This paper describes a subsystem, of DSS in financial crisis management, which automatic discovers causes of financial crisis. That subsystem is based on data mining techniques. Applied algorithm can very well be integrated with database operations, since generalization operations are set-oriented, and both data and knowledge are represented as relational tables, whereas named DSS is based on relational data warehouse. Here is defined whole data mining process, based on this algorithm, for a study of financial crisis causes.

Paper-ID: 1009

On the Exploration of Semantics in Knowledge-based Decision Making Settings

EVANGELOU Christina
Greece

KARACAPILIDIS Nikos
IMIS Lab Greece

ABOU KHALED Omar
Engineering School of Fribourg, Switzerland

Contributed paper

Keywords: Knowledge Engineering and Management

This paper deals with the definition of the appropriate semantics for the efficient gathering, sharing, and reuse of knowledge in a collaborative decision making context. We use two evolving approaches, namely ontologies and XML schemata. Generally speaking, the former provides the means to specify domain theories, while the latter the means to specify integrity constraints for diverse information sources (i.e., documents and/or semi-structured data). By exploiting the above, we aim at establishing a shared and common understanding of a specific problem domain that can be communicated between people and distributed application systems.

Paper-ID: 775

Building Implicit Learning Systems for Teaching Expert Knowledge

KOCHIN Dmitry
Russian Federation

PODLIPSKY Oleg
Moscow Institute for Physics and Technology Russian Federation

Contributed paper

Keywords: Artificial Intelligence, ES and Neural Networks, Decision Theory and Analysis, Medical Applications

The paper presents the basic ideas of building intellectual computer systems for teaching procedural expert knowledge. The systems utilize the principle of implicit learning. Two subproblems are under consideration - the elicitation of expert decision rules and the construction of the system for teaching these rules. Authors present the methodology of practicable realization of these ideas in application to teaching the art of acute cardiac infarction diagnostics.

Paper-ID: 1303

Intellectual capital portfolio selection: value drivers and priorities for organizational change

ANDRIKOPOULOS Andreas
Athens University of Economics and Business (AUEB) Greece

Contributed paper

Keywords: Knowledge Engineering and Management

Ex post examination of a firm's performance in key intellectual capital (IC) indicators can demonstrate the organizational change aspect of IC management. These insights support a mean-variance IC portfolio selection framework. Our portfolio selection model consists of two stages. First, we calculate mean returns and variances for each portion of IC. In the second stage, portfolio selection provides organizational priorities. In this setting, the portfolio weights stand for organizational priorities, the weight constraints represent organizational barriers of change and the correlation of returns stands for the organizational interdependence of the IC components.

Parallel Sessions

Tuesday, July 6

TA18, 9:00 – 10:30 **Jupiter Lobby**
Discussion Presentations IV

Paper-ID: 287, TA18, 09:00-09:30, Panel #1
Spot Market Based Inventory Planning Tools

CARGILLE Brian
KAKOUROS Steve
Hewlett-Packard Company France

Discussion presentation paper

Keywords: Auctions / Competitive Bidding, Decision Support Systems, Production and Inventory Systems

Existing models that determine the amount of inventory required typically assume a single source of supply to replenish the inventory stockpile and do not fully capture the options available from both a negotiated supply contract and an internet auction site or other spot market. The authors demonstrate a tool developed by and currently in use at Hewlett-Packard Company that determines the percentage of supply which should be purchased through traditional negotiated contracts and from the spot market for different commodity characteristics (e.g. price, lead time) resulting in minimum total supply cost for the business.

Paper-ID: 999, TA18, 09:00-09:30, Panel #19
A Methodology for Locating Transfer Stations and Waste Treatment Facilities

MITROPOULOS PANAGIOTIS
ADAMIDES EMMANUEL
GIANNIKOS Ioannis
University of Patras Greece

IOANNIS Mitropoulos
Technological Educational Institute of Patras Greece

Discussion presentation paper

Keywords: Multi-Criteria Decision Aids, System Dynamics and Theory, EWG LA Locational Analysis

We present the main principles of an integrated system whose main objective is to support decisions related to the location and operation of waste treatment facilities and transfer stations. The system employs Geographic Information Systems and Soft Systems Methodology to represent the available information and to identify the various social aspects of the problem. It then uses heuristic techniques to select an initial configuration of treatment sites and transfer stations. Finally, the system applies ideas from System Dynamics to assess the future operational implications of this configuration under alternative scenarios.

Paper-ID: 771, TA18, 09:00-09:30, Panel #37

The Impact of Organizational Identification and Self-esteem on Organizational Citizenship Behavior: The Case of Greek Public Hospitals

BELLOU Victoria
University of Piraeus

Discussion presentation paper

Keywords: Human Resources Management, Teleworking

The main purpose of this research, which has been carried out in Greek public hospitals, was to examine two factors that are expected to affect employee behavior. In specific, we examined the impact of organizational identification and self-esteem on Organizational Citizenship Behavior (OCB). Statistical analysis of the data provided by the 164 nurses and doctors that participated support most of the hypotheses stated. At the end of the paper, theoretical and practical implications of OCB for the effective operation of public hospitals in Greece follow.

Paper-ID: 331, TA18, 09:30-10:00, Panel #2

Design of effective e-service for electronic business archive

BECEJSKI-VUJAKLIJA Dragana
Faculty of Organizational Sciences Serbia and Montenegro

Discussion presentation paper

Keywords: Entrepreneurship, Information Retrieval – filtering, Management Information Systems

The paper elaborates an solution of designing an effective e-service for electronic business archive, storing electronic documents and providing services of retrieval of the stored documents based on different criteria, over Internet. This idea has been born under influence of the modern development trends in the field of data processing and changes in data processing structures. There are three groups of basic services. Mutual traits of these groups are common technological basis and interoperability. Main advantage of the solution is effective retrieval at a low cost per document. The project will be realized in the newly founded Incubation centre.

Paper-ID: 1004, TA18, 09:30-10:00, Panel #29

SHORT-TERM PLANNING OF A MANUFACTURING SYSTEM USING PETRI NETS

TUNCEL Gonca
EREN AKYOL Derya
Dokuz Eylul University Turkey

Discussion presentation paper

Keywords: Production and Inventory Systems

Petri nets have recently emerged as a promising tool for modeling and analysis of flexible and automated manufacturing systems. Their graphical representation and precise mathematical definition make Petri nets appealing in various fields. In this study, a manufacturing system is modeled using Petri nets. After finding the minimal t-invariants of this Petri net model, the short term planning problem of the system is formulated. Then, the problem is transformed into a linear programming problem with the objective of minimizing the total cost incurred by holding inventory and backlogging demands.

Parallel Sessions

Tuesday, July 6

Paper-ID: 1284, TA18, 09:30-10:00, Panel #38

On Dual Simplex Methods for Two-Sided Constraint Linear Optmisation

ARENALES Marcos
SOUSA Ricardo
Instituto de Ciencias Matemetica e de Compustaio - ICMC/USP

SILVA Carla Lucke
University of Sao Paulo Brazil

Discussion presentation paper

Keywords: Mathematical Programming, Programming, Linear

In this paper we study the linear optimization problem lower and upper constrained (i.e., there are lower and upper bounds on constraints and variables) and develop dual simplex methods that explore the dual problem, which is linear piecewise, in some sense, nonlinear. Different one-dimensional searches were examined. Computational experiments showed that the exact one-dimensional search to the dual simplex direction has the best performance.

Paper-ID: 1488, TA18, 10:00-10:30, Panel #12

Airline daily schedule recovery model

KALIC Milica
PAVKOVIC Goran
Faculty of Transport and Traffic Engineering Serbia and Montenegro

Discussion presentation paper

Keywords: Airline Applications, Scheduling, EWG Transportation

The problem of operational airline schedule under irregular events like equipment failures, bad weather at an airport, airport capacity restrictions, late or absent crew member etc. is considered. The effects of these disturbances are some delayed flights and/or cancellations. Decision-maker about delays and cancellations is dispatcher in Airline Operations Control Center. Also, dispatcher redesigns an operational schedule, rerouting aircraft and/or crews. A new model for handling schedule perturbations and flight schedule redesign has been developed, together with appropriate, user-friendly software interface. This model is illustrated by JAT Airways schedule example.

Paper-ID: 1490, TA18, 10:00-10:30, Panel #21

Using System Dynamics and Multicriteria Analysis for Performance Measurement in a Radiotherapy Department

SANTOS Sergio
BELTON Valerie
HOWICK Susan
University of Strathclyde United Kingdom

Discussion presentation paper

Keywords: Health Care, Multi-Criteria Decision Aids, System Dynamics and Theory

Radiotherapy is an important element in cancer treatment, both for cure and for palliation. Whilst performance measurement and performance improvement are a major concern of most radiotherapy departments, measuring and managing the performance

of these departments is particularly challenging. This paper will feature a case study in a radiotherapy department aimed at showing how system dynamics and multicriteria analysis could be used in an integrated way to enhance the existing performance measurement practices of the department, and the nature of the practical difficulties and challenges that arise in their use.

Paper-ID: 344, TA18, 10:00-10:30, Panel #3

INFORMATION SYSTEM FOR MANAGEMENT OF THE MAINTENANCE SYSTEM FOR BUS & COACH

IVANOVIC Gradimir
Faculty of Mechanical Engineering Serbia and Montenegro

Discussion presentation paper

Keywords: Management Information Systems, Transportation and Logistics

This paper presents a developed and implemented information system (IS) used to manage the maintenance system of motor vehicles and spare parts in a company which transports passengers in city, suburban city, inter-city and international and tourist travel. IS is developed to monitor, analyze and manage (management: planning, organizing, managing and controlling) the maintenance system of motor vehicles. Databases have been developed for the maintenance system regarding workers, locations, failures, vehicles, maintenance operations, spare parts and reports on maintenance, for the purpose of providing valid information required for managing the maintenance system. Documents, computer network and software support it.

Paper-ID: 1041, TA18, 10:00-10:30, Panel #30

Variation of Internal Degree of Yields on Concession Projects in Association to the Duration of the Construction and the Exploitation of the Investment

KALFAKAKOU GLYKERIA
CHRISTAKOS evangelos
ANASTASIADIS Konstantinos
A.U.TH. Greece

Discussion presentation paper

Keywords: Economic Modeling, Engineering Management, Financial Engineering

The constructional and the operational duration are basic parameters for the estimation of the internal degree of yields (IDY) on contention projects. The construction period is predefined, is binding for the contractors, and during this time the company has no income. The operational duration is also predefined and has only an upper limit since the criterion for its estimation is the time in which the price of the function of the _present value_ of the participial fund and dividends is annihilated or becomes positive . In this study is examined the effect of the above parameters on the IDY.

Paper-ID: 1320, TA18, 10:00-10:30, Panel #39

The development of an integrated IT framework structured around an ISO 9001:2000 process based quality management system to improve the operational performance.

HUSSAIN NAVEED
United Kingdom

Discussion presentation paper

Keywords: Engineering Management, Management Information Systems, Quality Management

This paper provides an overview and describes a methodology for the structured development of an IT framework, based around three key concepts, the new ISO 9001:2000 quality management standard, information management systems and the intranet to improve operational performance of a medium sized contract Engineering company. The IT framework developed will support defined business processes within the organisation involved with the management of projects. Finally the paper discusses how the IT framework developed can act as a tool to capture data, information and knowledge for projects and contracts to provide a competitive advantage in the market place for the organisation.

TC02, 14:00 – 15:30 **Delphi Amphitheater**

Scheduling: Multiple objectives and uncertainty (C84)

Chair: DELLA CROCE Federico

Paper-ID: 1482

Enumerating the Pareto optima for a bicriterion flowshop scheduling problem

DELLA CROCE Federico
Politecnico di Torino Italy

VINCENT T'kindt
Ecole d'Ingénieurs en Informatique pour l'Industrie France

BOUQUARD Jean-Louis
Université de Tours France

Contributed paper

Keywords: Multi-Objective Decision Making, Programming, Integer, Scheduling

We consider a two-machine flowshop problem with the objective of minimizing the number of late jobs and a common unknown due date where we search for all the strict Pareto Optima. We show that the problem is weakly NP-Hard and propose an exact procedure applying an epsilon-constraint approach. Peculiarity of the exact procedure is an integer programming formulation of a related flowshop problem. From this formulation we derive a variable fixing technique and present valid inequalities to the corresponding linear programming relaxation. The procedure is able to solve instances with up to thousands of jobs in size.

Paper-ID: 1333

Job-Shop Scheduling under Vagueness

EIDEN Wolfgang Anthony
University of Darmstadt Germany

Contributed paper

Keywords: Decision Support Systems, Fuzzy Sets and Systems, Scheduling

In this paper, we present a new heuristic method for the job-shop scheduling problem with vague processing times. Although the job-shop scheduling problem has often been investigated, very little of this research is concerned with the uncertainty characterized by the imprecision in problem variables. The method introduced combines standard scheduling methods like retrograde termination and load-balanced scheduling with fuzzy methods. As a benefit we are able to handle vagueness and to integrate both human knowledge and human reasoning processes in the scheduling process. The modus operandi is illustrated step-by-step by an example.

Paper-ID: 991

A BICRITERIA SCHEDULING PROBLEM WITH SEQUENCE-DEPENDENT SETUP TIMES

EREN Tamer
KIRIKKALE University Turkey

GUNER Ertan
Gazi University Turkey

Contributed paper

Keywords: Metaheuristics, Programming, Integer, Scheduling

In this study, we consider the bicriteria scheduling problem with the sequence-dependent setup times on a single machine. Considered criteria are: total completion time and the total tardiness. We propose a 0-1 integer programming model to solve the problem that is NP-hard problems class and tested on a set of randomly generated problems. A heuristic approach basis on tabu search is also proposed to overcome the inefficiency of the integer programming model. To the best of our knowledge, this is the first study that attemps to solve the problem.

Paper-ID: 992

Minimizing Total Flowtime and Total Tardiness in a Two-Machine Flowshop Scheduling Problem

EREN Tamer
KIRIKKALE University Turkey

GUNER Ertan
Gazi University Turkey

Contributed paper

Keywords: Metaheuristics, Programming, Integer, Scheduling

This study attempts to solve a two-machine flowshop bicriteria scheduling problem, in which the objective function is to minimize a weighted sum of total flowtime and total tardiness. To tackle the problem, an integer programming model with n2+4n variables

and 5n constraints where n is the number of jobs, is formulated. The computational results show that the proposed integer programming model is effective in solving problems. For problems containing larger number of jobs, also proposed a heuristic algorithm.

TC03, 14:00 – 15:30 — Athena
Combinatorial Optimization (C14)

Chair: SIMEONE Bruno

Paper-ID: 1096

Privatization within a public holding: equivalent formulations, algorithms, and complexity

SIMEONE Bruno
University of Rome La Sapienza Italy

Contributed paper

Keywords: Combinatorial Optimization, Financial Modelling, Graphs and Networks

A public holding wants to sell some of its companies so as to maximize total revenue while not loosing the sure control of certain -strategic- companies. A chain of equivalent formulations of this problem is derived, namely, as a nonlinear MIP, a linear MIP, a continuous linear knapsack one plus one of the following: a binary LP, linear optimization subject to a Horn formula, a shortest hyperpath problem in a directed hypergraph. While the general problem is shown to be NP-complete, for shareholding networks of bounded degree one can solve it in polynomial time. Real-life examples are discussed.

Paper-ID: 266

A Branch-and-Cut Algorithm for the Error Localization Problem in Data Cleaning

RIERA-LEDESMA Jorge
DEIOC-Universidad de La Laguna Spain

SALAZAR GONZALEZ Juan José
Universidad de La Laguna (Tenerife) Spain

Contributed paper

Keywords: Combinatorial Optimization, Mathematical Programming

Data collected by statistical agencies may contain mistakes. Thus, the statistical agencies must check the consistence of their information. Each record has to be tested on a set of consistence rules. This leads to a combinatorial optimization problem known as the Error Localization Problem. We approach the optimization problem of finding the smallest set of fields whose values must be changed in order to satisfy a given set of consistence rules. With this purpose we propose an Integer Linear Programming model for the particular case in which the field are continuous values the consistence rules are given by linear inequalities.

Paper-ID: 41

Engel's conjecture

BOUROUBI Sadek
Faculty of Mathematics Algeria

Contributed paper

Keywords: Combinatorial Optimization, Complexity and Approximation, Graphs and Networks

K. Engel has conjectured that the average number of blocks in partition of an n-set is a concave function of n. The average in question is a quotient of two Bell numbers less 1. This conjecture is true for all n sufficiently large. We contribute to the resolution of this conjecture and we prove that Engel's conjecture is a immediate consequence of a high conjecture.

Paper-ID: 1417

DISTRICTING FOR ROBUST SAMPLING : A CASE STUDY

ROMERO David
BURGUETE Jorge
VELASCO Raūl
MARTINEZ Eduardo
INEGI Mexico

Contributed paper

Keywords: Combinatorial Optimization, Simulation

We present a districting problem arising in the planning process of statistical surveys regularly performed by the Mexican Institute of Statistics (INEGI). Like in many other districting problems, contiguity, compactness, and population criteria must be considered. We model this problem as a combinatorial optimization one, with compactness and population criteria incorporated into the objective function. A computer system has been implemented, whose core consists of a simulated annealing algorithm, to draw the more than 200,000 districts covering the totality of the Mexican territory. The results are encouraging.

TC04, 14:00 – 15:30 — Salon des Roses A

EWG MCAD: Multi-Criteria Aid for Decision (O10)

Chair: BRANS Jean-Pierre

Paper-ID: 1367

MCDA methods for sorting and clustering: Promethee TRI and Promethee CLUSTER

DE SMET Yves
Université Libre de Bruxelles Belgium

FIGUEIRA José
University of Coimbra Portugal

BRANS Jean-Pierre
Vrije Universiteit Brussel

Paper in an organized session

Keywords: Multi-Criteria Decision Aids, EWG MCAD Multi-Criteria Aid for Decision

In this paper extensions of the PROMETHEE methodology are proposed to treat sorting and clustering problems. PROMETHEE TRI has been designed for sorting and PROMETHEE CLUSTER for clustering problems. These procedures are using central reference actions to characterize categories and clusters. A profile is associated to each action. Deviations between the profiles of the actions and the reference actions are considered. A numerical application is presented to illustrate PROMETHEE TRI and PROMETHEE CLUSTER and their results are compared with those obtained by ELECTRE TRI. The open problems mentioned in this paper can stimulate further research.

Paper-ID: 1278

Multicriteria based GDSS: The next generation

SPRINGAEL Johan
University of Antwerp Belgium

DE KEYSER Wim
SIA Belgium

Paper in an organized session

Keywords: Decision Support Systems, Group Decision Making and Negotiation, EWG MCAD Multi-Criteria Aid for Decision

In this paper we present a new generation of multi criteria based group decision support methods, the structure of which is in general conceived so that decision-makers enjoy the largest possible freedom with respect to the expression of their opinion. Our approach involves two fundamental stages: a first in which decision-makers provide their ranking of the alternatives by using any MCDM and a second in which a consensus ranking is constructed out of the former rankings. With this new generation we would like to liquidate the criticisms of which the present GDSMs suffer, being a possible reason for their limited use.

Paper-ID: 666

Multiple criteria ranking using strong and weak outranking relations constructed via ordinal regression

SLOWINSKI Roman
Poznan University of Technology Poland

GRECO Salvatore
Universita di Catania Italy

MOUSSEAU Vincent
University Paris Dauphine France

Paper in an organized session

Keywords: Cutting and Packing, Multi-Criteria Decision Aids, EWG MCAD Multi-Criteria Aid for Decision

We characterize a method for multiple criteria ranking using stron or weak outranking relation. The preference information supplied by the decision maker is a complete preorder on a subset of reference alternatives, called reference preorder. The preference

model build via ordinal regression is an additive value function, like in the UTA method. Unlike in UTA, we take into account all compatible value functions at the stage of ranking. Moreover, we accept any additive form of the value function. The resulting relations in A are twofold: strong outranking (a partial preorder) and weak outranking (a complete preorder).

Paper-ID: 1370

Visualizing the PROMETHEE method

LAMBORAY Claude
Belgium

DE SMET Yves
Université Libre de Bruxelles Belgium

Paper in an organized session

Keywords: Multi-Criteria Decision Aids, EWG MCAD Multi-Criteria Aid for Decision

In multi-attribute utility theory, problems can be graphically represented in a very intuitive way: indifferent points, i.e. points with the same multi-attribute utility, belong to the same indifference curve, while the nature of the other points is easily determined by their relative position to this curve. Following this idea, we give a graphical representation of another multi-criteria method, namely the PROMETHEE method. For the sake of simplicity we restrict ourselves on a basic 2- dimensional problem. Every alternative considered is then compared to a specific reference point on the basis of its positive and negative flows.

TC05, 14:00 – 15:30 **Salon des Roses B**

Decision Theory and Analysis (C24)

Chair: JOHNSON Johnnie

Paper-ID: 191

Profitable exploitation of 'inside' information in a speculative market

JOHNSON Johnnie
University of Southampton United Kingdom

JONES Owen
University of Southampton United Kingdom

Contributed paper

Keywords: Decision Theory and Analysis, Forecasting, OR in Sports

We explore the extent to which trading decisions of those with privileged ('inside') information in a speculative market can be exploited by those without direct access to this information. Specifically, we investigate the degree to which information contained in prices(odds) and price movements in horse race betting markets can be used to develop profitable trading strategies. A conditional logic model is used to determine winning probabilities. This model incorporates techniques for parameterizing price curves and significant trading advantage is identified. The results challenge findings from previous studies concerning how information is employed in betting markets.

Paper-ID: 631

Decision making on the basis of utility function for Money

CIZMESIJA Mirjana
BAHOVEC Vlasta
Faculty of economics Croatia

Contributed paper

Keywords: Bayesian Statistics, Decision Theory and Analysis, Utility Systems

One of the possible approaches that take risk into account is expected utility criterion. Utility values must be assigned to all outcomes. In most business decision problems, the consequences for all combinations of actions and states of nature can be expressed as monetary values. A. Utility function represents the subjective attitude of a decision maker to risk and can be derived from monetary values.

Paper-ID: 801

Assessment of Approaches for Group Decision Making Problems

SERRAO Amilcar
Evora University Portugal

Contributed paper

Keywords: Analytic Hierarchy Process, Decision Theory and Analysis, Multi-Criteria Decision Aids

This research work analyses approaches that lead to efficient group decisions. The common approach for achieving an agreement is to harmonize preferences which lead to inefficient outcomes when there are multiple issues in a decision problem. The use of a utilitarian issue-by-issue approach of preference aggregation ensures an efficient outcome for the complete multiple-issue decision problem. The results show that groups can achieve better outcomes when preferences are aggregated and each group member is supported separately and uninfluenced by the others. In conclusion, this study shows that group decisions should acknowledge the diverging preferences of its individual members.

TC06, 14:00 – 15:30 — Nafsica A

Supply Chain Management V (C95)

Chair: EL OUARDIGHI Fouad

Paper-ID: 1672

Supply-chain management with a monopolist manufacturer and duopolist retailers

EL OUARDIGHI Fouad
ESSEC Business School France

PASIN Federico
HEC Montreal Canada

TARONDEAU Jean-Claude
ESSEC Business School France

Contributed paper

Keywords: Supply Chain Management

We design a differential game model of supply-chains competition involving one manufacturer and two competing retailers. We assume that the manufacturer allocates its effort between production, process improvement and advertising activities, while the retailers decide on their respective purchase rate and directly compete on the retail price. Using numerical means, we then compare the path of the decision variables in the non-cooperative game and the cooperative game, which results in a supply-chains competition.

Paper-ID: 1452

Competitive Models of Telecommunication Supply Chains with Effort Dependent Demand

CANAKOGLU Ethem
Turkey

BILGIC Taner
Bogazici University Turkey

Contributed paper

Keywords: Game Theory, Supply Chain Management

A two-stage supply chain consisting of one operator and one vendor is studied in both single period and multi period settings. The operator faces a stochastic market demand which depends on technology investment level. The decision variables for the operator are the capacity of the network and the technology investment level. For the competitive decentralized system, existence of Nash and Stackelberg equilibria for different scenarios are shown. For the multi-period an algorithm to find the centralized optimal solution is suggested. For the single and multi period models coordinating revenue sharing and quantity discount contracts are proposed

Paper-ID: 1577

Competitive Supply Chains

GUPTA Sudheer
University of Michigan

Contributed paper

Keywords: Game Theory, Marketing, Supply Chain Management

We study coordination incentives among manufacturers and retailers in competing linear supply chains. We model a situation where manufacturers in an oligopolistic industry decide on vertical supply chain structure through choice of contracts that achieve different degrees of coordination in decisions with their retailer, and compete on prices in differentiated products markets. We characterize equilibrium vertical structures and show how coordination incentives vary with few basic parameters such as the level of cost reduction achieved by manufacturers through process innovation, degree of knowledge spillovers, and extent of product differentiation. We also explore incentives for manufacturers to form horizontal alliances.

Parallel Sessions

Tuesday, July 6

TC08, 14:00 – 15:30 **Nafsica B**
Meta-Heuristics III (C54)

Chair: ANAGNOSTOPOULOS Konstantinos

Paper-ID: 761

A Reactive GRASP with Path Relinking for the Minimum Dummy Arc Problem

ANAGNOSTOPOULOS Konstantinos
KOTSIKAS Lazaros
Democritus University of Thrace Greece

Contributed paper

Keywords: Metaheuristics, Project Management and Scheduling

This paper presents a GRASP algorithm for solving the dummy-arc problem, i.e. an activity-on-arc representation of a project that has the minimum number of dummy arcs given that it has the minimum number of nodes. This problem was shown to be NP-hard. The standard GRASP was enhanced by a learning mechanism and a bias function for determine the next element to be introduced in the solution, and by path relinking, an intensification strategy. The procedure has been coded in Visual Basic, and it was tested on randomly generated problems in order to find out suitable values of its parameters.

Paper-ID: 328

Heuristics for the Mirrored Traveling Tournament Problem

RIBEIRO Celso
Brazil

URRUTIA Sebastién
Catholic University of Rio de Janeiro Brazil

Contributed paper

Keywords: Combinatorial Optimization, Metaheuristics, OR in Sports

Professional sports teams and leagues do not want to waste their investments in players and structure in consequence of poor schedules of games. We tackle the mirrored version of the Traveling Tournament Problem, where the objective is to minimize the total distance traveled by the teams. We propose a new heuristic based on the combination of the GRASP and Iterated Local Search metaheuristics. Very good solutions are obtained for benchmark problems and for a large instance associated with the main division of the 2003 edition of the Brazilian soccer championship.

Paper-ID: 1599

The Use of Tabu Search and Scatter Search in the Solution of Vehicle Routing Problems

GALVAO Roberto
COPPE/Federal University of Rio de Janeiro Brazil

MONTANE Fermén
SOSA Nelida
COPPE/UFRJ Brazil

Contributed paper

Keywords: Metaheuristics, Routing, Transportation and Logistics

We report on the use of two specific meta-heuristics in the solution of vehicle routing problems. A tabu search algorithm was developed for the solution of the Vehicle Routing Problem with Simultaneous Pick-up and Delivery Service, with good results in relation to both existing algorithms for this problem and lower bounds obtained using CPLEX. We also report some preliminary results on the use of scatter search for the Classical Vehicle Routing Problem.

TC10, 14:00 – 15:30 **Nefeli A**

OR for electronic services II (C65)

Chair: TSIAKIS Theodosios

Paper-ID: 897

Looking security through cryptography: Identification process to enable safety in e-services.

TSIAKIS Theodosios
Greece

STEPHANIDES George
PEKOS George
University of Macedonia Greece

Contributed paper

Keywords: OR for Electronic Services

Internet must compromise the basis through people and organizations deliver services and products. E-services are the opportunity for businesses to offer new ways for service operation and transaction. We demonstrate the essential values of this application, identify the differences between e-commerce and e-business and we prove that what we need to preserve is security. The basic concepts of security can be achieved by means of cryptography. It extends the confidence of trust and facilitates the establishment of a global electronic market-place. Conclusions are made about the flow of information in commercial transactions and the physical distribution of goods and services.

Paper-ID: 1268

Identifying Operational Research Opportunities in e-Government Infrastructure: the case of the Greek Ombudsman

GOULIELMOS MARKOS
UNIVERSITY OF PIREAUS

Contributed paper

Keywords: OR for Electronic Services, OR/MS and the Public Sector, Service Operations

This paper presents a case study for the design of the new internal information systems infrastructure for the Greek Ombudsman. Central in the new design is a web-based infrastructure that allows many diverse systems to be incorporated for providing electronic citizen service. Within this infrastructure we examine opportunities for the

application of OR models and processes. OR is not suitable for the processing of citizen complaints' cases or disputes with other agencies, however it can play an important role in extracting patterns of data and performing a statistical evaluation of the cases.

Paper-ID: 35

Challenging e-democracy An Overview of Regulatory and legal Implications on e-voting

KOSMOPOULOS Athanassios
Information Society Managing Authority / Ministry of National Economy Greece

Contributed paper

Keywords: Cyber Cities & Communities, Innovation, Web-based information systems

This paper addresses democracy-oriented regulatory and legal requirements as well as technical issues that e-democracy impacts. It demonstrates that the structure of the political system plays a significant role in the decision to develop an Internet voting application. Major disadvantages on the subject of direct democracy are observed, mainly the fact that most political problems cannot be reasonably approached with a simple "yes" or "no", as referenda do. Conclusively the paper focuses on the specific attributes an electronic voting system should respect and ensure such as transparency, verifiability, accountability, security and accuracy in relation to the constitutional requirements

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TC11, 14:00 – 15:30 **Executive Room Alpha**

Airline Applications II (C02)

Chair: MARIN Angel

Paper-ID: 582

Taxi Planning: A Lagrangian Decomposition approach

MARIN Angel
Universidad Politécnica de Madrid Spain

Contributed paper

Keywords: Airline Applications, Large Scale Optimization, Programming, Integer

Taxi Planning is modelled using a binary multi-commodity flow formulation over a time-space network model to represent the flight movements from the gate to the taxiway and vice versa. The flow capacity constraints are used to represent the conflicts and competence between aircrafts using a given airport capacity. A Lagrangian Decomposition approach has been adapted to solve it. The computational tests have been run on Madrid-Barajas airport configurations, using actual data from the airport traffic, and comparing our approach with Branch and Bound.

Paper-ID: 1385

Passenger and Baggage Flow in an Airport: a Simulation Approach

BRUNETTA Lorenzo
ROMANIN-JACUR Giorgio
University of Padova Italy

Contributed paper

Keywords: Airline Applications, Decision Support Systems, Simulation

Due to strict security checks and to the adoption of new flight management systems, large amounts of passengers are simultaneously present in airports during peak intervals, and airport structures become stressed and particularly sensitive to any shift from planned schedules. A useful instrument to foresee malfunction and related evolution in time, and to suggest suitable remedies, is discrete simulation, implemented by using friendly software. Here we present a detailed but flexible model of passenger and baggage flows: easily adaptable to different airports, running on a PC by means of package MicroSaint, and easily readable also to non expert users.

Paper-ID: 1061

New structures for the collection and distribution of route-charges for the air navigation service provision in Europe.

OMERO Marta
UKOVICH Walter
PESENTI raffaele
CASTELLI Lorenzo
University of Trieste Italy

Contributed paper

Keywords: Airline Applications

This work aims at exploring new possibilities for determining the structure of both route-charges and their collection and distribution system. At present, route-charges are based only on route length, aircraft size, and a coefficient for each state determined in such a way to recover the total expected costs. Innovative rules are designed to promote integration among all actors, to reduce perturbations in the system, and provide an incentives/penalties system fostering safety levels, technical equipment renewal, service quality, performance improvement, and control capacity enhancement.

Paper-ID: 106

Emerging Trends in Customer Relations Management: Evidence from the Travel and Tourism Industry

CONSTANTELOU Anastasia
Greece

Contributed paper

Keywords: Airline Applications, Enterprise Resource Planning Systems

The paper focuses on the use of ICTs in the organisation and management of customer relations in the travel and tourism industry. The report uses the results of an exploratory study involving detailed interviews in 18 companies (airlines, travel agents, tour operators, passenger transportation companies) based in Germany, Greece, Italy, France and the UK. The questionnaire was divided into five sections: - The functional changes occurring in business functions related to CRM - The organisational changes brought about by e-CRM - The impacts of change, and - The drivers, barriers and perspectives from the introduction of e-CRM.

TC12, 14:00 – 15:30 **Executive Room Beta**

Non linear programming II (C73)

Chair: SODINI Claudio

Paper-ID: 1349

A solution algorithm for a class of box constrained quadratic programming problems

SODINI Claudio
CAMBINI Riccardo
University of Pisa Italy

Contributed paper

Keywords: Global Optimization, Mathematical Programming, Programming, Nonlinear

In this paper we suggest an algorithm to solve a box constrained quadratic problem with objective function given by the sum of a quadratic strictly convex separable function and the square of an affine function multiplied by a real parameter. Depending on the value of the real parameter, the problem might be convex or not. In order to reduce the size of the problem, we suggest how to fix the optimal value for some of the variables. The problem is then solved by means of an efficient parametric algorithm which uses some global optimality conditions even in the non convex case.

Paper-ID: 204

A Unified View of Existence of Optimal Solutions, Duality, and Minimax Theory

BERTSEKAS Dimitri
MIT United States

Contributed paper

Keywords: Game Theory., Programming, Nonlinear

We explore some intimate connections between several fundamental issues in nonlinear programming and zero sum game theory. The main tool is a single, powerful new theorem on the non emptiness of the intersection of a nested sequence of closed sets. Staring from this theorem, we give a unified analysis of the major conditions for min-max=max-min, for existence of optimal solutions of constrained optimization, and for the absence of a duality gap.

Paper-ID: 105

A New Procedure for Resource Investment Problem with Discounted Cash Flows

NAJAFI Amir Abbas
AKHAVAN NIAKI Seyed Taghi
SHARIF UNIVERSITY OF TECHNOLOGY Iran, Islamic Republic Of

Contributed paper

Keywords: Programming, Nonlinear, Project Management and Scheduling, Scheduling

A project scheduling problem in which the availability levels of the resources are considered to be decision variables and the goal is to find a schedule and resource requirement levels such that some objective function optimizes, is called a Resource Investment Problem (RIP). In this paper we consider a RIP in which the goal is to maximize the Net Present Value (NPV) of the project cash flows. We call this problem as Resource Investment Problem with Discounted Cash Flows (RIPDCF) and in this research we develop a heuristic method to solve it.

Paper-ID: 264

Boolean Inverse Optimization Problems

DEMANGE Marc
ALFANDARI Laurent
ESSEC, Paris

MONNOT Jerome
Paris-Dauphine University France

Contributed paper

Keywords: Combinatorial Optimization, Complexity and Approximation, Graphs and Networks

In Inverse Combinatorial optimization, we are given an instance of a combinatorial optimization problem and a feasible solution, and we wish to find a minimum variation of the cost vector (under the L1-norm in this work) so that this solution becomes optimal in the modified instance. In this paper, we consider such problems where the components of the modified cost vector are constrained to be integer or boolean. In particular, we study matching and network problems and provide polynomial cases, hardness and approximation results.

TC13, 14:00 – 15:30 **Executive Room Gamma**

Routing (C80)

Chair: MATOS Ana

Paper-ID: 593

A routing and scheduling system for waste collection

MATOS Ana
Escola Superior de Tecnologia - Instituto Polit_cnico de Viseu Portugal

OLIVEIRA Rui
IST-UTL Portugal

Contributed paper

Keywords: Large Scale Optimization, Metaheuristics, Routing

We study the case of a waste collection system of a large area where there are 8087 containers with different frequencies of visit per week. The company's aim is to satisfy the community's needs using the available resources with the minimum total collection cost. The problem has been formulated as a Period Vehicle Routing Problem, solved by a two-phase approach. The first phase of analysis consists of an Ant System model in which an initial infeasible solution is constructed. The second phase involves a graph colouring problem and an interchange procedure to convert this infeasible solution into a feasible one.

Parallel Sessions

Tuesday, July 6

Paper-ID: 452

HEURISTIC OPTIMIZATION TECHNIQUES FOR SOLVING THE VEHICLE ROUTING PROBLEM WITH TIME WINDOWS.

GUILLEN Eduardo
University of La Coruña Spain

FAULIN Javier
Public University of Navarra Spain

GARCIA DEL VALLE Alejandro
University of La Coru_a Spain

Contributed paper

Keywords: Routing, Scheduling, Transportation and Logistics

In this paper we present a new method to solve the well-known problem of vehicle routing with time windows constraints. The method is based on a simple construction procedure in which nodes are added according to a combined mechanism of additions and insertions. Both conceptual and mathematical models are presented as well as the support software tool. Comparisons are established with other similar methods, such as Solomon (1987), or Dullaert (2002). We provide solutions for the 56 Solomon benchmark problems, obtaining better results than other construction algorithms in some instances.

Paper-ID: 648

A new formulation for the Capacitated Arc Routing Problem

MARTINEZ-OJEA Carlos
FERNANDEZ Elena
Universitat Politécnica de Catalunya Spain

GARFINKEL Robert
School of Business Administration United States

Contributed paper

Keywords: Combinatorial Optimization, Routing

We propose a new model for the Capacitated Arc-Routing Problem and we present various types of valid inequalities for the model. We describe the separation problem for each of the considered inequalities. We study the performance of an iterative LP-based algorithm that uses the proposed model. At each iteration, inequalities violated by the current LP solution are identified and added to the model. We also present a heuristic that starts by rounding the LP solution of the model. Computational experiments have been performed and the results are reported.

Paper-ID: 1030

Vehicle Routing Optimization for the Pick-up an Delivery: Application to the transport of personnel on oil platforms

VELASCO Nubia
DEJAX Pierre
GUERET Christelle
Ecole des Mines de Nantes France

Contributed paper

Keywords: Combinatorial Optimization, Programming, Integer, Routing

We consider a pick up and delivery problem with time windows in which personnel has to be transported by helicopters on oil platforms. This problem is subject to particular constraints. Given a number of helicopters and of demand requests, the goal is to find the number and the routes configuration that satisfy the demands and minimize the cost. The most used methods to solve this kind of problems are column generation approches, taboo search and simulated annealing. We present here an adaptation of a column generation approach to solve this problem, and we test it on real instances.

TC14, 14:00 – 15:30 **Executive Room Delta**

Quality Management (C75)

Chair: GOTZAMANI Katerina

Paper-ID: 494

The New ISO 9000:2000 Standards: The Main Reasons For Their Revision and The Key Improvements

GOTZAMANI Katerina
UNIVERSITY OF MACEDONIA Greece

Contributed paper

Keywords: Quality Management

The ISO 9000 family of quality management standards has earned a global reputation as the basis for establishing quality management systems. However, there were certain limitations in the previous series of standards that have been detected through literature review and empirical surveys in certified companies worldwide. In order for ISO 9001:2000 certification to further advance quality systems, it is important for companies to realize the true value of the standards. This paper fully describes the reasons and the business needs that led to the revision of the new series, as well the main changes and improvements for the certified organisations.

Paper-ID: 202

Average Unit Cost of a Continuous Sampling Inspection

HAJI Alireza
MAHLOOJI Hashem
HAJI Rasoul
Sharif University of Technology Iran, Islamic Republic Of

Contributed paper

Keywords: Quality Management, Stochastic Models

In this paper is we derive the total cost for one of the most commonly used continuous sampling plans in industry. The total cost includes the costs of inspection, reworks, and returned defective items from the customers. The continuous sampling plan under study is commonly known as CSP-1 which consists of alternate sequences of %100 inspection and random inspection and is used for continuous production system. To

achieve our objective, we use a method which employs the concepts of renewal reward processes to obtain the long run average unit cost of the sampling plan.

Paper-ID: 742

The process management in an enterprise

JOVETIC Slavica
Faculty of Economics Serbia and Montenegro

Contributed paper

Keywords: Quality Management Strategic Planning and Management

The main point of the paper is to present of the project of process management according to ISO 9000:2001 and TQM criteria. The processes are determined by entry, process phases, factors affecting the process and exit. The process management includes the following: clearly defining key parameters of the mentioned elements, determining their desired values and directing all positive factors of the effect on the process so it could be directed toward desired values. The project of the process management is being performed in the consistent, disciplined set of steps based on quality costs management and statistical methods application.

Paper-ID: 929

Management of Proposal Evaluation Activities in a Regional Operational Programme with Simulation

GEROGIANNIS Vassilis
SYRAKOULIS Kleanthis
YPSILANDIS Pandelis
Technological Education Institute of Larissa, Greece

FITSILIS Panos
Greece

Contributed paper

Keywords: Management Information Systems, Simulation

This paper presents the prototype of a discrete-event simulation model which aims to support management of proclaiming and evaluation activities within the context of the regional operational programme of Thessalia (ROP-Th) in Greece. The ROP-Th is one of the 13 operational programmes which are devoted to 13 regions of Greece respectively. The objective of the proposed business-process simulation is to assist the managing authority of the ROP-Th to experiment with re-engineering solutions which reduce delays in the evaluation of proposals submitted in response to calls for proposals. The paper reviews evaluation processes, identifies simulation objectives and discusses representative simulation experiments.

TC15, 14:00 – 15:30 **VIP Lounge**
Network Design and Optimization (C96)

Chair: ATAMTURK Alper

Paper-ID: 1475
Robust Network Optimization with Demand Uncertainty

ATAMTURK Alper
University of California at Berkeley United States

ZHANG Muhong
University of California United States

Contributed paper

Keywords: Programming, Integer, Robust Optimization

We describe a robust optimization approach for solving the network flow and design problems with polyhedral demand uncertainty. We study complexity and algorithms. We describe polynomially solvable cases for budget demand uncertainty. Applications to facility location, production/distribution problems are given.

Paper-ID: 608
The Image Containment Problem and some classes of polynomial instances.

RINALDI Franca
Universitá di Udine Italy

PESENTI Raffaele
Universitá di Palermo Italy

Contributed paper

Keywords: Energy Policy and Planning, Network Design

The Image Containment Problem (ICP) is a design problem concerning the containment of polyhedra that arises, in particular, in the control problem of production-distribution systems and in the distribution of public utilities. The ICP is NP-hard. We study a particular family of ICP instances, called Worst Case Demand (WCD). We show that both the problems of recognizing and solving WCD instances are polynomial. Then we characterize the classes of instances that are WCD independently of the choice of the cost vector (SWCD classes). Finally, we describe two cases of SWCD classes that are interesting from an applicative point of view.

Paper-ID: 69
Shortening Task Completion Time with the Execution-Windows Method

LASLO Zohar
KEREN Baruch
Negev Academic College of Engineering Israel

Contributed paper

Keywords: Network Design, Programming, Linear

We consider a set of assembling operations with known execution durations and precedence priorities that must be accomplished. The operations can be carried out on an acyclic network with identical set of robots on each conveyer (arrow). The number of the depots (nodes) is a known integer. Between each pair of depots we can locate only one conveyer. We seek for an arrangement of the network and a plan that divides the operations among the conveyers and minimize the task completion time. We use linear programming optimization, subject to reasonably general rules for distributing the operation-fragments among the conveyers.

Paper-ID: 768

A lagrangian method for the local access network expansion problem

KETABI Saeedeh
University of Isfahan Iran, Islamic Republic Of

Contributed paper

Keywords: Network Design, Programming, Integer, Telecommunications

Growing demand makes organizations expand and improve their local access network(LAN)s. LANs, which connect switching centers to different divisions and customers within the area, is important, because these networks account for a large amount of investments in communication facilities. In this research, a mixed integer program is proposed for the minimum cost network expansion plan. This model considers the tradeoff between facilities' locations, cable type and size; investment and operating costs. Then a Lagrangian relaxation solution procedure is proposed. The Lagrangian relaxation problem is separated into two subproblems, one is a shortest path and the other is a knapsack problem.

TC18, 14:00 – 15:30 — Jupiter Lobby
Discussion Presentations V

Paper-ID: 1322, TC18, 14:00-14:30, Panel #13

Allocating indivisible objects: Integer Linear Programming in Fair Division

DALL'AGLIO Marco
MOSCA Raffaele
Italy

Discussion presentation paper

Keywords: Game Theory, Programming, Integer

The problem of allocating several items to several players that value those items differently is discussed. Most of the available results regard continuously divisible items, while many mathematical tools fail to hold when each object has to be assigned in its entirety to one of the players. We discuss the benefits of applying ILP techniques to the following problems: find an allocation (i) which maximizes the minimum payoff, (ii) which minimizes the maximum envy. After pointing out a polynomial-time solvable instance, we focus on the case n=2, showing a link between such problems and introducing approximation algorithms for their solution.

Paper-ID: 1492, TC18, 14:00-14:30, Panel #22

Assessing the comparative efficiency of British Telecom call-centres using Data Envelopment Analysis

DIMITRIOU Stavrianna
Athens University of Economics and Business Greece

ROBINSON Stewart
The University of Warwick United Kingdom

IOANNOU Agisilaos
British Telecom Exact Technologies United Kingdom

TARANTILIS Christos
IOANNOU George
Athens University of Economics & Business Greece

Discussion presentation paper

Keywords: Data Envelopment Analysis, Multi-Criteria Decision Aids, Telecommunications

Given the great importance of call centres in today's customer centred enterprises, the objective of this study was to develop robust decision-making tools for estimating their efficiency and providing improvement feedback using Data Envelopment Analysis (DEA). The proposed DEA methodology identifies factors that affect efficiency performance, selects the most appropriate efficiency frontier derivation model, and provides direct answers concerning individual factor significance and overall call centre efficiency. The methodology has been applied to several call centres of British Telecom and comparison of the results to the current practice are reported, proving that DEA prevails over conventional benchmarking methodologies.

Paper-ID: 818, TC18, 14:00-14:30, Panel #31

XML - A Technology for Competitive Advantage

BOSHNJAK Sasa
BOSHNJAK Zita
Faculty of Economics Serbia and Montenegro

Discussion presentation paper

Keywords: Management Information Systems, Project Management and Scheduling, Web-based information systems

One of the better paths to successful implementation of XML follows an innovative, value-added approach for building Internet based business architecture. In this paper we present our approach to the implementation of XML based strategic plan. The plan for incorporating XML into general strategy includes several variations of the traditional System Development Life Cycle (SDLC). We consider each phase in the general project management approach and map into the generic XML project tasks with four different phases. One of the strengts of our approach is that each phase in the development of XMLbusiness solutions is clearlly supported.

Parallel Sessions

Tuesday, July 6

Paper-ID: 355, TC18, 14:00-14:30, Panel #4

Traditional Services Transformation: the application of ecommerce in the insurance industry

MARWA SIMMY
LANCASTER UNIVERSITY - LANCASTER (UK)

TSOUKATOS Evangelos
TEI of Crete, School of Management and Economy Greece

Discussion presentation paper

Keywords: Innovation, Service Operations, Technology Management

The Internet provides a relatively inexpensive medium of data distribution, enabling businesses to reach potential customers worldwide, just with a click. The implication of so many people accessing vast amounts of data cannot be underestimated, particularly by insurance, an information driven industry. Pressure to provide real-time 24/7 interactive customer service is becoming intense for insurers whose interaction with customers has usually been limited to periodic encounters. This paper examines the ecommerce evolution, potential, and transformation in the insurance industry. Strategy and potential insurer barriers are subsequently explored. Finally we conclude with emerging trends and future of ecommerce.

Paper-ID: 1045, TC18, 14:00-14:30, Panel #40

An ERP system for attacking business processes under ISO standard

THEODORAKOPOULOS Dimitris Nikos
Greece

TARANTILIS Christos
Athens University of Economics and Business Greece

KIRANOUDIS Christos
National Technical University of Athens Greece

Discussion presentation paper

Keywords: Decision Support Systems, Quality Management, Work Flow Management Systems

In this paper we present a Business Process Management (BPM) information system, developed on three main concepts: Business processes, business events (which comprise business processes) and time management. The system manages the entire workflow of an enterprise, increasing efficiency and control. Initially, the system uses ISO business processes as a starting point. Consequently, one can obtain ISO certification by implementing the system, control Quality Management digitally and concurrently avoid the bureaucracy ISO entails. Moreover, the system extends itself to almost any business process, adapting to actual specific business needs of the client.

Paper-ID: 1323, TC18, 14:30-15:00, Panel #14

Assessing the Closed Loop Supply Chain of mobile phones in Cyprus

KOKKINAKI Angelika
BORUA Sasank
Intercollege Cyprus

Discussion presentation paper

Keywords: Decision Support Systems, Reverse Logistics / Remanufacturing

In this paper, we examine the Closed Loop Supply Chain (CLSC) of mobile phones in Cyprus. The main objective is to picture frame current CLSC activities and to develop a baseline and a benchmarking mechanism for possible further advancements. To do this, we collect primary data through a survey and interviews of the key players and we analyze the CLSC processes at strategic, tactical and operational level. Based on this, we will develop a decision making framework for CLSCs of mobile phones in Cyprus for long, medium and short term perspective.

Paper-ID: 1494, TC18, 14:30-15:00, Panel #23

The Development of Neural Network in Form of XML Web Service For Solving the Problems of Data Mining's Classification

LAZAREVIC Sasa D.
RADENKOVIC Bozidar
Faculty of Organizational Sciences Serbia and Montenegro

Discussion presentation paper

Keywords: Data Mining and Data Base Modeling, Decision Support Systems, Software for OR/MS Analysis

The development of a distributed neuro-classifier is composed of three major parts: - Neural Network Tool - a software tool for construction of multilayer neural network and its training with the application of back propagation algorithm; - Data Mining Classification Support Environment - a software environment which provides support for the process of solving a practical data classification problem; it is developed for the precisely defined application domain; - Distributed Neural Network - specific Data Mining application in form of neural network, trained to solve specific classification task, exposed as a distributed application service, i.e. XML Web service.

Paper-ID: 832, TC18, 14:30-15:00, Panel #41

WEIGHTED APPROVAL VOTING WITH AHP FOR E-COGNOCRACY

ESCOBAR Maria Teresa
Universidad de Zaragoza Spain

MORENO-JIMENEZ José Maria
Spain

RALUY Agustin
TURON Alberto
Universidad de Zaragoza Spain

Discussion presentation paper

Keywords: Analytic Hierarchy Process, Group Decision Making and Negotiation

Following the new proposal for the democratic system, e-cognocracy, this paper analyses the different procedures proposed in the literature for synthesising the citizens' opinion. It also presents a new voting method which allows us to incorporate the intensity in preferences within the context of approval voting. This new procedure, which makes use of one of the most commonly applied multi-criteria decision making techniques, the Analytic Hierarchy Process, allows us to extract patterns of behaviour and critical points from the decisional processes with respect to which the citizens' opinion is sought.

Paper-ID: 1060, TC18, 15:00-15:30, Panel #33

The evaluation of Hellenic E-Government application as an important quality factors. The case of Hellenic Central Public Administration

DROSOS DIMITRIOS
GRADUATE TECHNOLOGICAL EDUCATION INSTITUTE OF PIRAEUS Greece

YANNACOPOULOS Denis
TEI of Piraeus

Discussion presentation paper

Keywords: Decision Support Systems, OR and the Internet, OR for Electronic Services

Today we expect information and services to be online and available around the clock in our homes, schools and work places. We have been quick to adopt new ways of communicating both in business and in our personal life. Government is responding to these new demands. E-government is all about government agencies working together to use technology so that they can better provide individuals and businesses with government services and information. This paper presents the evaluation of the Hellenic E-Government applications. As follows, a model of the use of multi-criteria is applied which based on the methods of Linear Programming.

Paper-ID: 838, TC18, 15:00-15:30, Panel #42

A Methodology for Approximating the Demand Space in Continuous Demand Covering Models

GIANNIKOS Ioannis
University of Patras

DIMOPOULOU Maria
Athens University of Economics and Business Greece

Discussion presentation paper

Keywords: Location, Metaheuristics, EWG LA Locational Analysis

We present a methodology for investigating the error caused by alternative approximations of the demand space in demand covering problems. The methodology is based on the solution of a series of demand covering problems, under alternative definitions of the demand space. In each problem we consider the following objectives: (a) minimization of total cost, (b) maximization of covered area and (c) maximization of multiple coverage. We introduce an algorithm for solving each of these problems quickly and demonstrate that it is not necessary to select the maximum number of demand points in order to approximate a continuous demand area accurately.

Paper-ID: 435, TC18, 15:00-15:30, Panel #6

The use of Internet by SMEs in Tourism :The case of Hersonisos, Crete

KARAGIANIS Stefanos
TSOUKATOS Evangelos
TEI of Crete, School of Management and Economy Greece

Discussion presentation paper

Keywords: Entrepreneurship, Innovation, Marketing

A trend of increasingly using the Internet as a transactions vehicle is evident in Tourism worldwide. The experts of World Travelling Observatory forecast that until 2005, the share of e-travel in Europe will reach 37% of the entire market. Compared to other industries, the tourism industry in Greece is very slow in adopting new technologies. The findings of a study investigating the determinants of the use of Internet by the tourist SMEs in Crete are presented. The study was undertaken in the region of Hersonisos which is the most developed tourist region in the northern axis of the island.

TD02, 16:00 – 17:30 **Delphi Amphitheater**
Scheduling: Batch and groups (C84b)

Chair: KUBIAK Wieslaw

Paper-ID: 277
Preemptive Open Shops with Group Operations
KUBIAK Wieslaw
Memorial University of Newfoundland Canada
DE WERRA Dominique
Switzerland
KIS Tamas
Computer and Automation Research Institute Hungary

Contributed paper

Keywords: Combinatorial Optimization, Scheduling, Timetabling

We study preemptive open shops with group operations, where jobs have both individual operations, requiring a single processor, and group operations, requiring all processors from one of two groups of processors. We show that preemptions at integer points do not result in shortest possible makespan, and that optimal solutions can be found in polynomial time whenever fractional preemptions are allowed. We give a rounding procedure for approximate solutions with preemptions at integer points which remain within a constant absolute error from optimal makespan. Finally, we discuss cases for which optimal preemptions at integer points can be found in polynomial time.

Paper-ID: 1329
Batch Scheduling with Identical Jobs and Machine Setup Times
MOSHEIOV Gur
ORON Daniel
The Hebrew University of Jerusalem Israel

Contributed paper

Keywords: Scheduling

In batch scheduling, the number of batches and the job allocation to batches have to be determined, when taking into account the well known trade-off between a few large batches and many small batches. We focus on the special case of unit processing time jobs and sequence- and machine-independent setup times. We introduce efficient optimal solutions for minimizing makespan and flow-time on various machine settings: a single machine, an m-machine flow-shop, an m-machine open-shop and a 2-machine job-shop.

Paper-ID: 555

Hoist Scheduling to manufacture batches of different jobs with identical sizes

MATEO Manuel
COMPANYS Ramon
Universitat Politecnica Catalunya Spain

Contributed paper

Keywords: Production and Inventory Systems, Scheduling

In some lines composed of several tanks jobs must be submerged in tanks and a hoist moves them along the sequence of baths. This scheduling problem about the hoist movements is known as HSP (Hoist Scheduling Problem). In this work, the consecutive manufacturing of complete batches is compared with the merging capability of taking units from each one of the batches. We present some properties to reduce the initial potential number of sequences. The branch-and-bound procedure to obtain the sequence for hoist movements that minimizes the cycle time in this second option also study the n-cyclic case.

Paper-ID: 1003

A fuzzy goal programming approach to scheduling of a multi-product batch-processing machine

AKOZ Onur
PETROVIC Dobrila
Coventry University, United Kingdom

Contributed paper

Keywords: Fuzzy Sets and Systems, Multi-Objective Decision Making, Scheduling

A scheduling problem arising in the ceramics industry is considered. Loading and scheduling of a kiln for firing the glazed products is considered as a multi-criteria problem, where the criteria concern production throughput, work-in-process inventory levels, budget and demand for glazed products. Fuzzy numbers are used to represent decision maker satisfaction of obtaining target values associated with the criteria. A fuzzy goal programming approach is used to find a satisfactory loading and scheduling solution.

TD04, 16:00 – 17:30 **Salon des Roses A**

EWG MCAD: MCAD and Artificial Intelligence I (O09a)

Chair: SLOWINSKI Roman

Paper-ID: 750

Qualitative Evaluation of Decision Alternatives using Reasoning Maps: Discussing Ordinal Operators for Performance Aggregation

MONTIBELLER Gilberto
Kingston Business School, Kingston University United Kingdom

BELTON Valerie
University of Strathclyde United Kingdom

Paper in an organized session

Keywords: Decision Support Systems, Multi-Criteria Decision Aids, EWG MCAD Multi-Criteria Aid for Decision

Causal (or cognitive) maps have proved to be powerful tools for supporting problem structuring in strategic decision-making. However, they provide limited support for the evaluation of decision alternatives. To overcome this issue, we have recently proposed a special type of causal structure, called Reasoning Map, to support both problem structuring and the evaluation of alternatives. In this modelling, qualitative operators are employed to aggregate the performances of alternatives, along the causal network. This paper focuses on an analysis and evaluation, from a theoretical and a practical perspective, of the different types of qualitative operator available for performing these aggregations.

Paper-ID: 1035

Valued PQI Interval Orders

TSOUKIAS Alexis
LAMSADE - CNRS France

OZTURK Meltem
Universite Paris Dauphine France

Paper in an organized session

Keywords: Artificial Intelligence, ES and Neural Networks, Fuzzy Sets and Systems, EWG MCAD Multi-Criteria Aid for Decision

The paper presents some recent results concerning the use a valued hesitation in the comparison of intervals. A continuous valuation of positive and negative reasons is considered thus allowing to take into account different types of uncertainty. The approach is compared to the general frame of bi-polar bi-capacities recently introduced in the literature. Further on, it is shown that within such a frame is possible to handle interesting problems in reasoning about similarities as well as in temporal logic.

Paper-ID: 385

A Decision-Making Support System for Organization Management

MONTMAIN Jacky
French Atomic Commission

Paper in an organized session

Keywords: Decision Support Systems, Multi-Criteria Decision Aids, EWG MCAD Multi-Criteria Aid for Decision

Several goals may be assigned to an organization. The set of these goals constitutes the mission of the organization. The manager then defines the strategy of the organization: the goals are formed into a hierarchy in order to define priorities. This step is modeled by a multi-criteria analysis. The aim of the manager is to achieve his goals in an optimal way regarding the effort produced by the organization. Then this notion of optimal improvement is used to construct malfunctioning indicators of the organization. An analogical reasoning in terms of energy is proposed.

Parallel Sessions

Tuesday, July 6

TD05, 16:00 – 17:30 **Salon des Roses B**

Decision Support Systems (C22)

Chair: KAKLAUSKAS Arturas

Paper-ID: 1013

Web-Based Decision Support in Ethics

KAKLAUSKAS Arturas
VALDAS Pruskus
ZAVADSKAS Edmundas
Vilnius Gediminas Technical University Lithuania

Contributed paper

Keywords: Decision Support Systems, Human Centred Processes, Multi-Criteria Decision Aids

Ethical problems may be efficiently solved on the grounds of models of ethical decision-making. Therefore, the criteria from utilitarianism, deontological ethics, justice and other ethical theories can be highlighted in the matrices of ethical decision-making. Based on the analysis of the different ethical decision making models and methods an Ethical Multiple Criteria Decision Support Web-Based System (EDSS) was developed by authors. Applying the created EDSS the decision maker can investigate different alternatives in respect one or several stakeholders by employing one or several theories of ethics and the data basis of best practice. Practical example is considered in the paper.

Paper-ID: 133

An Internet Based Decision Support System for the Optimal Allocation

KEPAPTSOGLOU Konstantinos
KARLAFTIS Matthew
VLACHOGIANNI Eleni
NTU Athens Greece

Contributed paper

Keywords: Decision Support Systems, Location, Transportation and Logistics

Bridges are vital parts of road networks. In cases of earthquakes or severe weather conditions, keeping bridges clear of debris is important for the operation of the road network. In order to clear debris, specially equipped crews have to be deployed, managed by local authorities that usually have neither the modern expensive technology nor the knowledge of deploying them. A decision support system, incorporating a location model is developed, for deploying debris removal crews. The system is internet based and provides the ability of remotely obtaining bridge data and solving the problem, quickly, accurately with a minimal cost.

Paper-ID: 237

A Goal Programming Model for Business Expansion Decisions

GEORGIOU Andreas
HAJIDIMITRIOU Yannis
University of Macedonia Greece

Contributed paper

Keywords: Multi-Objective Decision Making, Programming, Linear Strategic Planning and Management

The business landscape is characterized by globalization of business activities and intensified competition. International expansion is evolving into a critical factor for the survival of a large number of firms. Greek firms will strengthen their presence in the business environment of the Southeastern Europe, in an effort to maintain or improve their competitiveness. In this paper we develop a business expansion model, which uses the goal programming technique and takes into consideration the business conditions and factors in the candidate countries, which the firm considers as crucial for the success of the expansion venture.

Paper-ID: 1186

A bi criteria model for planning production activities

TARI Abdelkamel
RADJEF Mohand
YAHIA Souad
University of Bejaia, Algeria

Contributed paper

Keywords: Global Optimization, Metaheuristics, Multi-Objective Decision Making

A food-processing firm, CEVITAL, is facing the problem of scheduling production activities of its different orders. This firm is refining crude oil in order to supply the "processing " unit and the "margarine" unit. After analyzing the problem in the "refining" unit, We have modeled this situation as a bi criteria mixed model.

We have used a hybrid method based on genetic algorithms and lexicographical method to solve this model. We have also designed and implemented a database in order to get optimal planning. We compared our results with different heuristics.

TD06, 16:00 – 17:30 — Nafsica A

Production & Inventory Systems I (C67)

Chair: SAWIK Tadeusz

Paper-ID: 90

Master Scheduling in Make-to-Order Assembly by Integer Programming

SAWIK Tadeusz
AGH University of Science & Technology Poland

Contributed paper

Keywords: Flexible Manufacturing Systems, Production and Inventory Systems, Programming, Integer

An integer programming formulation is proposed for long-term master scheduling of customer orders in a hybrid flowshop with multi-capacity machines and a finite output buffer. A batch processing mode and various due date related performance measures are considered. For the proposed formulation new cutting constraints are identified.

Numerical examples modeled after a real-world make-to-order assembly system in the electronics industry are provided and results of extensive computational experiments with CPLEX solver are reported.

Paper-ID:488

Production planning problem with different setups as a bilevel programming problem

SORIC Kristina
LUKAC Zrinka
VOJVODIC ROSENZWEIG Visnja
Faculty of Economics Croatia

Contributed paper

Keywords: Production and Inventory Systems, Programming, Integer, Scheduling

We consider the production planning problem with sequence dependent setups on two machines.The object is to minimize the total setup and the sum of the costs of production, backlog, storage and setup. We divide the above problem into two subproblems by introducing the hierarchy into the model and model the problem as a bilevel mixed 0-1 integer programming problem. The object of the leader is to assign the items to the machines, while the object of the follower is to minimize the production, backlog, storage and setup cost of the machine. We develop a heuristics based on tabu search.

Paper-ID: 854

A Genetic Algorithm for Efficient Production Scheduling

ZOBOLAS George
TARANTILIS Christos
Athens University of Economics and Business Greece

MITROPOULOS Haris
NTUA Greece

OANNOU George
Athens University of Economics & Business Greece

Contributed paper

Keywords: Metaheuristics, Production and Inventory Systems, Supply Chain Management

In this paper we consider the problem of master scheduling when demand exceeds available capacity. The solution is based on Holland_s Genetic Algorithm and involves the representation of delaying or delivering earlier an order as a gene of a chromosome. A reasonable number of solutions produced by the algorithm are assessed with a Rough Cut Capacity Plan and the best ones are used to generate new solutions. The process stops automatically when little improvement is recorded between two successive generations. The algorithm provides good results in real-life problem sizes and most importantly within a limited amount of time.

TD07, 16:00 – 17:30 **Nefeli B**
Project Management and Scheduling I (O31)

Chair: HERROELEN Willy

Paper-ID: 598
Exact and heuristic procedures for the discrete time/cost trade-off problem under various assumptions

VANHOUCKE Mario
Ghent University and Vlerick Leuven Gent Management School Belgium

DEBELS Dieter
Ghent University Belgium

Paper in an organized session

Keywords: Project Management and Scheduling

Time/cost trade-offs in project networks have been the subject of intensive research. In the discrete version of the problem, it is generally accepted that the trade-off follows a discrete non-increasing pattern. However, due to its complexity, the problem has been solved for relatively small instances. In this presentation, we elaborate on extensions of the discrete time/cost trade-off problem. We give an extensive literature overview for these problem types, and present both exact and heuristic solution approaches for them. We demonstrate that the heuristic algorithms produce good results, which is very encouraging since this should allow for solving large problem instances.

Paper-ID: 599
Population Based Meta-Heuristic approaches for the Resource-Constrained Project Scheduling Problem

DEBELS Dieter
Ghent University Belgium

DE REYCK Bert
London Business School United Kingdom

LEUS Roel
KULeuven Belgium

VANHOUCKE Mario
Ghent University and Vlerick Leuven Gent Management School Belgium

Paper in an organized session

Keywords: Metaheuristics, Project Management and Scheduling, Scheduling

In the last few decades, several effective algorithms for solving the resource-constrained project scheduling problem have been proposed. However, the challenging nature of this problem, summarized in its strongly NP-hard status, restricts the effectiveness of exact optimization to relatively small instances. We present various population-based meta-heuristic approaches, that are inspired on principles of scatter-search, electromagnetism and genetic algorithms. Computational experiments illustrate that, thanks to a problem specific approach, these procedures are capable of producing consistently good results for challenging instances of the resource-constrained project scheduling problem.

Paper-ID: 606

Heuristic column generation for a medical staff scheduling problem

BELIEN Jeroen
DEMEULEMEESTER Erik
Katholieke Universiteit Leuven Belgium

Paper in an organized session

Keywords:Health Care, Programming, Linear, Project Management and Scheduling

The problem of optimal staff scheduling is a difficult task in many organizations. Typically, such problems can be formulated as generalized set covering problems in which the variables represent individual staff schedules. The model is then solved using column generation, avoiding the need to deal with all variables explicitly. The resulting algorithm iteratively solves a master problem and a number of pricing problems producing new variables to be added to the master. In order to limit computation times we present heuristic alternatives for both the master and pricing problem and present computational results for a medical staff scheduling problem.

Paper-ID: 591

The trade-off between quality robustness and stability of project schedules

HERROELEN Willy
VAN DE VONDER Stijn
DEMEULEMEESTER Erik
Katholieke Universiteit Leuven Belgium

Paper in an organized session

Keywords: Project Management and Scheduling

Most of the research efforts on resource-constrained project scheduling under uncertainty focus on protecting the project due date for disruptions during execution. We develop a heuristic algorithm for minimizing a stability cost function (weighted sum of deviations between planned and realized activity starting times). We provide an extensive simulation experiment to investigate the trade-off between quality robustness (measured in terms of project duration) and solution robustness (stability). We address the issue whether to concentrate safety time in order to protect the project completion or to scatter safety time throughout the baseline schedule in order to enhance stability.

TD08, 16:00 – 17:30 — Nafsica B

Integer programming (C72)

Chair: SHINMURA Shuichi

Paper-ID:51

A new algorithm of the linear discriminant function using IP and LP

SHINMURA Shuichi
Seikei Univ. Japan

Contributed paper

Keywords: Programming, Integer, Programming, Linear

A new optimal linear discriminant function is developed minimizing sample error rate with IP (IP-OLDF). This method is examined by comparing to three conventional discriminant functions; Fisher_s linear discriminant function, Quadratic discriminant function and L1-norm discriminant function using LP (LP-OLDF). IP-OLDF obtains better solution than conventional methods. Also IP-OLDF's effectiveness on external check is proved. However, there is problem about calculation time. Hence, a modified approach has been developed to enhance performance. This new algorithm (IPLP-OLDF) can achieve optimal solution within 20 seconds. Moreover, this is expected to introduce new statistical facts by combinatorial optimization.

Paper-ID: 79

New model formulations of the Generalized Minimum Spanning Tree Problem

POP Petrica Claudiu
North University of Baia Mare Romania

Contributed paper

Keywords: Combinatorial Optimization, Graphs and Networks, Programming, Integer

We consider a generalization of the Minimum Spanning Tree Problem, called the Generalized Minimum Spanning Tree Problem, denoted by GMST. It is known that the GMST problem is NP- hard. The problem has many applications in: telecommunications, railway optimization, etc. We present a stronger result regarding its complexity, namely, the GMST problem is NP-hard even on trees as well an exact exponential time algorithm for the problem based on dynamic programming. We describe new mixed integer programming models of the GMST problem, mainly containing a polynomial number of constraints. We establish relationships between the polytopes corresponding to their linear relaxations.

Paper-ID: 547

A Lagrangean/surrogate Approach to Point-Feature Cartographic Label Placement

LORENA Luiz A. N.
RIBEIRO Glaydston
INPE Instituto Nacional de Pesquisas Espaciais Brazil

Contributed paper

Keywords: Cutting and Packing, Large Scale Optimization, Programming, Integer

The cartographic label placement is an important task in automated cartography. Positioning the texts requires that overlap among them be avoided, that cartographic conventions and preference be obeyed. So, the label placement belongs to a problem area of difficult solution. A variety of methods have been proposed to generate quality labeling, with a wide range of results. This work presents an application of the Lagrangean/surrogate relaxation to the Point-Feature Cartographic Label Placement. The Lagrangean/surrogate relaxation was explored recently as a faster computational alternative to traditional Lagrangean heuristics. The computational tests produced quality-labeling placements for instances up to 1000 points.

Paper-ID: 958

The Efficient solutions of fractional Integer Multiple objective Problem

CHAABANE Djamal
Mathematics Faculty Algeria

Contributed paper

Keywords: Multi-Objective Decision Making, Programming, Integer

In this communication, we consider the problem of Integer Multiple Objective Fractional Optimization. We propose a finite method analogous to simplex steps algorithm with fractional objective functions and solves a sequence of progressively more constrained integer linear programming problems. The whole set of integer efficient solutions (Supported and non-supported) is obtained without missing anyone.

TD09, 16:00 – 17:30 — Jupiter (small)
Financial Modelling I (C32)

Chair: JABBOUR George

Paper-ID: 701

Valuation of Currency Options Using Higher Order Moments

JABBOUR George
ONAYEV Zhan
PETRESCU Mircea
The George Washington University United States

Contributed paper

Keywords: Financial Engineering, Financial Modelling, Risk Analysis and Management

This paper incorporates skewness and kurtosis to value currency options. The currency exchange rates under consideration are not lognormally distributed between February 1989 and February 2004. This result violates one of the assumptions of Black-Scholes model for option pricing. Alternatively, we use another model incorporating higher moments via Edgeworth expansion directly applied to the probability density function. Option values and comparative statics (the "Greeks") are illustrated for both models. Significant differences in the results have been observed.

Paper-ID: 702

STOCK PORTFOLIO CONSTRUCTION USING MULTICRITERIA ANALYSIS

DIMITRAS Augustinos
Athens University of Economics and Business Greece

Contributed paper

Keywords: Financial Modelling, Group Decision Making and Negotiation, Multi-Criteria Decision Aids

For the creation of a profitable portfolio of stocks, the most important step is the selection of the best ones available in a market. This study proposes the multi-criteria method UTADIS for the selection of stocks incorporating financial ratios and market ratios, as well as the preferences and knowledge of experts. The study illustrates the

application of the method on the stocks exchanged in Athens Stock Exchange. The application is extended to five years and the method is evaluated according to its usefulness in a decision process.

Paper-ID: 705

Dividend and Stock Repurchase Policy with Transaction Costs

TSUJIMURA Motoh
Kyoto University Japan

Contributed paper

Keywords: Finance and Banking, Financial Modelling

In this paper, we examine an optimal dividend and stock repurchase policy with transaction costs under uncertainty. we assume that when the firm pays out dividends it incurs proportional transaction costs, while when it repurchases stock it incurs both fixed and proportional transaction costs. The firm's problem is to choose the dividend and stock repurchase policy in order to maximize the firm's expected total discounted dividends and stock repurchases function. To this end, we formulate it as a combined stochastic control problem: a mixed absolutely continuous and impulse control problem. Then, we show an optimal dividend and stock repurchase policy.

TD10, 16:00 – 17:30 — Nefeli A

OR for electronic services III (O05)

Chair: MATSATSINIS Nikolaos

Paper-ID: 1667

A Multi-criteria Web-Based Decision Support System for Evaluation of an e-Learning System

DELIAS Pavlos
KARAGOUNAKIS Aggelos
MATSATSINIS Nikolaos
Technical University of Crete Greece

Paper in an organized session

Keywords: Multi-Criteria Decision Aids, OR for Electronic Services, Web-based information systems

In this study, we have developed a three-tier web-based decision support system to uphold the evaluation process. We implemented a web interface to collect data from the users. In that part we use a multi-criteria approach that models the case and a linear-oriented technique to solve the problem. To evaluate the e-learning system, we use a set of sixteen sub-criteria that corresponds to three main criteria. The focus of this study was to utterly support the e-learning systems evaluation process in order to comprehend the factors that lead to an effective and useful e-learning system.

Parallel Sessions

Tuesday, July 6

Paper-ID: 57

Service Level Agreements (SLA): a tool for the management of electronic services

FITSILIS Panos
Greece

GEROGIANNIS Vassilis
Technological Education Institute of Larissa, Greece Greece

Contributed paper

Keywords: OR for Electronic Services, Project Management and Scheduling, Service Operations

Service Level Management is the process which ensures that Service Level Agreements and Operational Level Agreements or contracts are met, and that any adverse impact on electronic service quality is minimised. The purpose of an SLA is to define a number of key areas of activity that represent the most important qualities expected by the users. The aim of this paper is to define the key areas of activity to be used for drafting an SLA for an electronic service. Particular attention is given to the monitoring of service levels for each of the Direct Measure of Quality targets.

Paper-ID: 1347

A Genetic-Multiobjective Approach to Maximize Availability for Computing Services in Educational Environments

OSORIO-LAMA Maria
PINTO David
Autonomous University of Puebla Mexico

SANCHEZ-LOPEZ Abraham
Mexico

Contributed paper

Keywords: Metaheuristics, Multi-Objective Decision Making, OR for Electronic Services

We present a multi-objective approach to solve an availability optimization problem for a system that provides electronic services in an educational environment conformed by 5 subsystems working in a 12x7 framework to provide service for 2200 users. Each subsystem has a set of redundant components to guarantee full time availability. We know the average failure and repair times for each component. The objective is to reach the maximum value of availability considering maintenance costs. The optimization method uses a genetic algorithm that finds a pseudo-Pareto frontier by searching the minimum cost exploring the complete range of availability in the system.

TD11, 16:00 – 17:30 **Executive Room Alpha**
Logistics (C98)

Chair: AMPAZIS Nikolaos

Paper-ID: 584
Real-time Distribution Management Models

AMPAZIS Nikolaos
MINIS Ioannis
MAMASIS Konstaninos
University of the Aegean Greece

Contributed paper

Keywords: Combinatorial Optimization, Metaheuristics, Transportation and Logistics

Motivated by advances in wireless and mobile technologies, real-time distribution management is becoming a promising possibility. In this paper we present cases, in which real time distribution management is beneficial, and a control architecture that is able to address pragmatic situations. For some of these cases we present formal models inspired by the Vehicle Routing Problem and other known problem formulations. We also explore key characteristics and properties of these models. Finally, we discuss alternative approaches for addressing some important cases, including heuristic methods and branch and bound schemes that form a key part in the aforementioned architecture.

Paper-ID: 923
A Continuous Approximation Model for Hierarchical Logistics System with Economies of Scale

WATANABE Daisuke
SUZUKI Tsutomu
University of Tsukuba Japan

Contributed paper

Keywords: Transportation and Logistics

This paper analyzes the optimal hierarchical collection/distribution system for many-to-one (or one-to-many) transport demand using a criterion of total transport cost minimization. We employ the continuous terminal locations and define the parameters which are scale economy of quantity and distance, and demand points. The problem is to find the optimal number of levels and of facilities in each level when the quantity of demand and the number of destinations are given. We assume that facilities are locatable in a continuous plane and the number of levels, the number of facilities in each level and the vehicle size are scalar variables.

Paper-ID: 941
Quantitative Models for Reverse Logistics Structures

SALEMA Maria Isabel
Centro de Matemática e Aplicações Portugal

BARBOSA-POVOA Ana Paula
IST Portugal

NOVAIS Augusto
INETI Portugal

Contributed paper

Keywords: Facilities Planning and Design, Programming, Integer, Reverse Logistics / Remanufacturing

In recent years, society's attitude towards environmental issues has changed, leading to a growing significance of Reverse Logistics. Since RL covers both forward and reverse flows, an integrated analysis should be performed at different levels of the RL structures: distribution, production planning, inventory. We propose a model for the design of a distribution network in a RL context. The model considers a single period, multi-product system with constraints on production/storage capacities, where the number of products in each network may differ. Two case studies were solved where the model generality could be corroborated and very satisfactory performance results achieved.

TD12, 16:00 – 17:30 **Executive Room Beta**
Continuous optimization I (O25)

Chair: LOPEZ-CERDA Marco A.

Paper-ID: 1311

An Adaptive Large Neighborhood Self-Regular Predictor-Corrector IPM for Linear Optimzation

TERLAKY Tamas
McMaster University Canada

Paper in an organized session

Keywords: Large Scale Optimization. Mathematical Programming, EWG EUROPT Continuous Optimization Working Group

Predictor-corrector methods in a large neighborhood of the central path are among the most efficient IPMs for LO. The best iteration bound for classical PC-IPMs is O(n log(1/eps)) when multiple centering steps are used. Here we propose a self-regular (SR) predictor-corrector IPM in a large neighborhood. In the predictor step we use either an affine scaling or an SR direction, while the corrector step always use a. an SR direction. We use a special proximity with different SR search directions and this allows an almost O(sqrt(n)log(n)log(1/eps)) worst-case iteration bound for our SR-PC-IPM and asymptotic quadratic convergence.

Paper-ID: 268

Defects of the dual problems in the linear semi-infinite optimization

TODOROV Maxim
Universidad de las Americas Mexico

Paper in an organized session

Keywords: Mathematical Programming, Programming, Nonlinear, EWG EUROPT Continuous Optimization Working Group

We consider parametric linear semi-infinite optimization in its very general form. We have given several sufficient conditions, under which the set of solutions of the dual

problem is bounded, or singleton. Examples, showing that even in the interior of the set of parameters, where the primal problems have very nice properties (bounded set of solutions, no duality gap, etc.), the dual problems could not have a solution. Density result in this direction has been proven.

Paper-ID: 423

Ill-posedness with respect to the solvability of linear optimization problems

TOLEDO Javier
Miguel Hernández University Spain

LOPEZ-CERDA Marco A.
Alicante University Spain

CANOVAS Maria Josefa
PARRA Juan
Miguel Hernández University Spain

Paper in an organized session

Keywords: Programming, Linear, EWG EUROPT Continuous Optimization Working Group

This talk deals with a concept of ill-posedness for linear optimization problems with an arbitrary number of constraints. We say that a problem is ill-posed when small perturbations of its coefficient vectors can yield different kind of problems. According to this idea, the boundary of the consistent, the bounded or the solvable problems could constitute concepts of ill-posedness for this properties. In particular, the ill-posedness concerning the consistency has been already analyzed in different contexts. Our goal in this talk is to speak about the ill-posedness with respect to the properties of boundedness and solvability of our problem.

Paper-ID: 502

Linear systems containing strict inequalities

RODRIGUEZ ALVAREZ Margarita
GOBERNA Miguel
JORNET Valentin
University of Alicante Spain

Paper in an organized session

Keywords: Programming, Linear, EWG EUROPT Continuous Optimization Working Group

The evenly convex hull of a given set is the intersection of all the open half-spaces which contain such set. We consider finite dimensional linear systems containing strict inequalities and (possibly) weak inequalities as well as equalities. The number of inequalities and equalities in these systems is arbitrary (possibly infinite). For such kind of systems we prove a consistency theorem and characterize those strict inequalities (weak inequalities, equalities) which are satisfied for every solution of a given system. Such results are formulated in terms of the evenly convex hull of certain sets which depend on the coefficients of the system.

TD14, 16:00 – 17:30 **Executive Room Delta**
Human resource management (C44)

Chair: KOSTOGLOU Vassilis

Paper-ID: 408

Design and implementation of a survey model for investigating the ICT labour market

KOSTOGLOU Vassilis
TEI of Thessaloniki Greece
PAPARRIZOS Konstantinos
University of Macedonia Greece

Contributed paper

Keywords: Data Envelopment Analysis, Human Resources Management

This work deals with the thorough exploration of the Information and Communications Technologies (ICT) labour market, a particularly interesting subject reflecting this sector's growth and prospects. A survey model is introduced consisting of the design of a structured questionnaire, which examines 200 relevant parameters. It was addressed to all Greek ICT enterprises. Totally 343 filled questionnaires were collected achieving a 31% response rate. All relevant issues are investigated including enterprises' profiles, human resource management policies, market's evolution and prospects and its association with education's outflows and ICT professions. Multivariate statistical analysis and hypotheses testing yielded important findings and results.

Paper-ID: 438

The impact of Internal Marketing to Market Orientation concept and their effect to bank performance

BOURANTA Athanasia
MAVRIDOGLOU george
KYRIAZOPOULOS Panagiotis
Graduate Technological Education Institute of Piraeus

Contributed paper

Keywords: Finance and Banking, Human Resources Management, Marketing

The paper presents a research study, which sought to explore the relationship between the Internal Marketing and Market Orientation as well as their effects on the bank sector performance. Human Resource managers of Greek banks participated in this survey constituting a response rate of 67,3% of the total population. A combination of a qualitative questionnaire and interviews was used in all banks. Moreover quantitative data were selected in order to estimate bank performance. The discussion of findings contributes to understand how Internal Marketing and Market Orientation are linked to the competences of the bank and its eventual performance.

Paper-ID: 744

IMPACT OF HUMAN RESOURCE ISSUES AND CHARACTERISTICS OF AN ORGANISATION ON AMT IMPLEMENTATION

DABNOON Mohamed
Dublin City university Ireland

Contributed paper

Keywords: Engineering Management, Flexible Manufacturing Systems, Human Resources Management

This paper documents the results reached from a major survey of manufacturing organisations in Ireland who have recently implemented the AMT. Quite apart from technical problems, it became clear that issues relating to two separate factors impacted on the degree of success or failure experienced by the organisations surveyed. The first factor was related to Human Resource issues such as Principal Needs, Job Assignments. The secondly was related to Characteristics of the Organisation such as Level of AMTs, Amount of capital invested in AMT. A statistical analysis of the raw data is presented and discussed and conclusions are drawn.

Paper-ID: 227

A CHAOTIC GROWTH EMPLOYMENT MODEL

JABLANOVIC Vesna
Faculty of Agriculture Serbia and Montenegro

Contributed paper

Keywords: Complex Societal Problems, Economic Modeling, Forecasting

Chaos theory is used to prove that erratic and chaotic fluctuations can indeed arise in completely deterministic models. Chaos theory reveals structure in aperiodic, dynamic systems. The basic aim of this paper is to provide a relatively simple chaotic growth employment model that is capable of generating stable equilibria, cycles, or chaos depending on parameter values. This nonlinear growth model uses chaos theory to explain complex motion of employment. This chaotic model exhibits a sensitive dependence on initial conditions:seemingly insignificant changes in the initial conditions produce large differences in employment.

TD15, 16:00 – 17:30 VIP Lounge
Economic Modelling (C25)

Chair: DANGERFIELD Brian

Paper-ID: 1413

A New Methodology for Macro-economic Modelling: towards a system dynamics based model for Sarawak

DANGERFIELD Brian
University of Salford United Kingdom

Contributed paper

Keywords: Economic Modeling, OR in Development, System Dynamics and Theory

This paper describes the current development of a system dynamics (SD) based macro-economic model for the state of Sarawak in East Malaysia. It is a work-in-progress but significant work has already been conducted. The focus of the model is the transformation of the State's economy from a resource-based one to a knowledge economy. The paper describes the envisaged scope of the model and details various sectors (such as education) which have been incorporated thus far. In conclusion a comparison is made between the use of SD for macro-economic modelling and the well-established economic modelling tools Input-Output analysis and econometric modelling.

Paper-ID: 458

Optimal Foreign Capital Demand - Panel Data of Transition Economies

PANKOVA Vaclava
University of Economics, Prague Czech Republic

Contributed paper

Keywords: Economic Modeling

Under GACR402/04/0756, CEZ:J18/98/311401001 projects, demand for capital is studied in transition economies. Supposed zero substitutability of domestic and foreign capital, necessary foreign aid can be qualified by Capital Substitution Two - Gap Model. In case of nonzero substitutability, a demand for foreign capital can be smaller. Model for testing zero/nonzero value of elasticity of substitution between domestic and foreign capital (proposed by Michalopoulos) is derived from optimal cost level and familiar cost - production duality relations. Using a set of panel data concerning twelve European transition countries, the elasticity parameter is estimated and interpreted in the given context.

Paper-ID: 805

FORECASTING ECONOMIC TRENDS OF THE SERBIAN ECONOMY

KIS Tibor
CILEG Marija
Faculty of Economics Serbia and Montenegro

Contributed paper

Keywords: Economic Modeling, Forecasting, Stochastic Models

This paper deals with the past and future development of Serbian economy. This economy experienced drastic changes during last decades: a number of political, societal, and regional transformations that meant structural changes and caused unexpected trend shifts. We present some results of a small-scale econometric model of the Serbian economy, aimed to study changes in development rates of basic economic categories and their relations, and to forecast economic trends. Forecasting in the situation of an economy under transition necessitates applying different statistical techniques combined with some judgmental methods.

Paper-ID: 1335
STUDY ON E-COMMERCE ENVIRONMENT IN LITHUANIA

SAKALAUSKAS Leonidas
BAKSHYS Donatas
Institute of Mathematics&Informatics Lithuania

Contributed paper

Keywords: Economic Modeling

Now all kinds of payments are used in Lithuania (Access products, Credit Cards and Charge Cards, Virtual Wallets/Accounts, Prepaid Value Products, Money Surogates, Billing, Mobile Payment Methods). Introduction of new technologies, further outlooks and rate of development and proliferation, impact on overall system of payments make this subject of investigation topical both theoretically and practically. The scope of research are: - The theoretical and statistical analysis of a typology of electronic payments in Lithuania; - Research of e-money competition and impact to economy; - Empirical evidence on electronic payment costs in Lithuania; - Optimal taxation and planning of electronic payments.

TD18, 16:00 – 17:30 Jupiter Lobby
Discussion Presentations VI

Paper-ID: 1511, TD18, 16:00-16:30, Panel #25
Quick MoS as back-office to OR teams

MOSSBERG Karin
FOI

BERGDAHL Karsten
Sweden

Discussion presentation paper

Keywords: Military Operations Research, OR/MS and the Public Sector, Simulation

The Swedish Defence Research Agency, FOI, has several OR teams working in different parts of the Swedish Armed Forces, supporting studies of future systems and military units. Such studies often benefit by modelling and simulation, but the resources within the OR teams is seldom sufficient for developing models. We therefore tested a new concept, Quick MoS, with a back-office group, supporting the OR teams in the development of small models. In the paper we will discuss our experience from using this concept which mainly was found successful.

Paper-ID: 852, TD18, 16:00-16:30, Panel #34
An Intelligent Decision Support System for Addressing Distribution Operations

MANDELLOS Nicholas
KIRANOUDIS Chris
National Technical University of Athens Greece

TARANTILIS Christos
Athens University of Economics and Business Greece

Discussion presentation paper

Keywords: Decision Support Systems, Service Operations, Transportation and Logistics

The Vehicle Routing Problem (VRP) arises in a variety of pick-up and delivery applications and can be described as the design of optimal delivery/collection routes from one or several depots to a number of customers at minimum cost. Many papers in the literature have addressed VRPs, and substantial research effort has been devoted in developing Decision Support Systems (DSSs) for solving a variety of VRPs. This paper presents an Intelligent DSS that enables logistics managers to approach real-life VRPs interactively, using artificial intelligence-based methods for measuring traffic flow and databases that contain information about spatial and customers' data respectively.

Paper-ID: 1066, TD18, 16:00-16:30, Panel #43

Converting Experience to Learning Material

KOUTSANTONIS Dionisis
MAVROMMATIS George
PANAYIOTOPOULOS John-Christ
University of Piraeus Greece

Discussion presentation paper

Keywords: Education and Distance Learning, Knowledge Engineering and Management, Military Operations Research

An Organization during its operation gains experience and develops knowledge. Expert e-Learning systems are focused on achieving Learning On Demand for the members of the organization, by utilizing this gained knowledge. The heart of these systems, the Expert AAA (Automated Authoring Application), is responsible for the conversion of corporate knowledge to learning material. This paper presents a proposal for the Expert AAA development which takes knowledge objects from the organization's central knowledge repository, and converts them to SCORM based learning objects, ready to be supplied to any SCORM-complaint e-learning software platform. Finally, an application case with Land Warriors is given.

Paper-ID: 1670, TD18, 16:00-16:30, Panel #7

The group decision making for Location Analysis of Wood Industry Plants, The Case of Iran

AZIZI Majid
Faculty of Natural Resources,University of Tehran Iran, Islamic Republic Of

Discussion presentation paper

Keywords: Decision Support Systems, Decision Theory and Analysis, Location

The improper sites of plywood and veneer factories have caused the unsatisfactory production. For future plants, it is decided to analyze the problem through scientific studies. Influential indicators for this matter were identified and an hierarchy was constructed based on five major groups of criteria. The weight of the indicators were then established by Analytical Hierarchy Process. These weights were employed in AHP(Expert Choice software) to rank 5 alternatives. Finally the potential sites were identified according to the priorities obtained by this technique. The result showed province of Kordestan has the highest priorities for location selection

Paper-ID: 1512, TD18, 16:30-17:00, Panel #17

A multimedia application on the most important mammals and birds of Greece for training purposes.

LEFAKIS Panagiotis
PARALIKIDIS Nikolaos
ANDREOPOULOU Zacharoula
Aristotle University of Thessaloniki Greece

Discussion presentation paper

Keywords: Data Mining and Data Base Modeling, Multimedia

This paper describes a multimedia application that aims to support in the training of students in our Department in A.U.Th. Especially, it concerns the presentation of mammals and birds of Greece as they are presented and taught in the Laboratory of Wild Life. The material that was collected, concerns information on species and families, pictures,etc necessary for the development of the educational application and it was selected from relative books, websites and laboratory archives. Data was stored in digital files. The variety of material facilitates the recognition as well as the identification of specific characteristics for each species.

Paper-ID: 856, TD18, 16:30-17:00, Panel #26

A systemic approach to real-time vehicle re-routing for urban distributions

ZEIMPEKIS Vasileios
GIAGLIS George
Athens University of Economics & Business Greece

TATARAKIS Antonios
University of the Aegean Greece

Discussion presentation paper

Keywords: Decision Support Systems, Mobile e-services, Transportation and Logistics

In urban freight movement a good, near-optimal, distribution plan is necessary but not sufficient for high performance distribution. This is mainly due to the probabilistic factors that urban movement depends on, such as high levels of traffic congestion, negative environmental impact, tight delivery time windows, vehicle breakdowns, unexpected events and so on. The aim of this paper is to present the design of a real-time event-driven vehicle re-routing system whose function is to re-compute the delivery plan of a vehicle fleet, based on historical information, real-time data collected from the vehicle and probabilistic models, in order to fulfil customer deliveries.

Paper-ID: 1087, TD18, 16:30-17:00, Panel #35

Methodology for auction simulation in Brazilian electricity market

MASILI Gustavo
Brazil

CORREIA Paulo
Unicamp Brazil

Discussion presentation paper

Keywords: Auctions / Competitive Bidding, Programming, Integer, Simulation

For the electric sector in the whole world, the transition from regulation to competition resulted in the introduction of auctions as transparent trade device between agents. In Brazil, Purchase, Sale, Certificate and Excess auctions had been formatted as transparent and fair form of negotiation. This paper considers the development of a simulator capable to represent these environments in a safe and efficient way, making possible the evaluation of participation's strategies for interested agents. For such achievements, besides the simulation environment representing the models, mathematical formulations based on optimization techniques had been developed to determine the negotiations accomplished in the auctions.

Paper-ID: 1085, TD18, 16:30-17:00, Panel #44

An effective business model proposition for multilingual econtent services

VOUDOURIS Irini
Athens University of Economics and Business

SAMARAS Kostas
Archetypon S.A. Greece

Discussion presentation paper

Keywords: Entrepreneurship, Innovation

This paper proposes an effective business model for the development and maintenance of multilingual web services. The value proposition of the suggested business model lies in the connectivity and networking among the main players of this fragmented market, namely content suppliers, web developers and localization service providers. The idea has been born under influence of the trends of the global Internet trading environment, where there is increasing need for translation and cultural adaptation for local markets. The development of the business model as well as the technical implementation of it is partially funded by the European's Commission e-Content Programme.

Paper-ID: 1374, TD18, 16:30-17:00, Panel #8

How the quality of services studies could be improved in a university department of European Studies.

DIAMANTIS Gabriel
University of Piraeus

Discussion presentation paper

Keywords: Education and Distance Learning, Quality Management

The satisfaction that the students receive from their studies is of great importance. The paper considers ways through which the measurement of service quality could determine the status of a department in International and European Studies. Student satisfaction is reliant on factors such as: the curriculum, the range of subjects taught, the academic staff training, the teaching materials, the social and intellectual experiences furnished by the institution. This research demonstrates that the IES department enjoys the highest rate of student satisfaction in comparison to the rest of the academic departments in the University. However, improvements and adjustments are required regarding the total number of contact hours per semester as well the teaching methods used.

Paper-ID: 1515, TD18, 17:00-17:30, Panel #18

Dynamic Maintainance of Approximate Set Covers

TELELIS Orestis
ZISSIMOPOULOS Vassilis
University of Athens Greece

Discussion presentation paper

Keywords: Combinatorial Optimization, Complexity and Approximation, Programming, Integer

We propose a fully dynamic output-bounded complexity algorithm for the minimum cost set covering problem. The dynamic algorithm maintains approximate set covers when the input data changes by subset insertions and deletions, or subset cost modifications. We develop a primal-dual analysis which captures the family of combinatorial optimization problems having a primal-dual approximation algorithm. Our algorithm generalizes upon the first fully dynamic algorithm proposed for the maintenance of optimum shortest paths trees. Our work is also related to previous results regarding dynamic maintenance of approximate set covers, when the input data changes by element insertions and deletions.

Paper-ID: 857, TD18, 17:00-17:30, Panel #27

Internet, e-commerce and m-commerce: new tools for increasing the competitiveness of Romanian companies in the globalisation process

UCENIC Camelia
Technical University Cluj Napoca, Romania Romania

ATSALAKIS George
Greece

Discussion presentation paper

Keywords: Marketing, Mobile e-services

Internet started as a medium to share information but became a tool to market products. After Romania began evolving toward a market economy, an important step was realized in the information development. The national .ro domain was introduced in February 1993. This was the beginning of a new way of doing business. In 1997 the Romanian companies, which had sites, represent less than 1% of the total registered companies, and NGO's, less than 0.01%. In 2002 represent 22%, respectively 14%. Nowadays e-commerce and m-commerce are new tools to increase the profit, to discover and exploit new markets.

Paper-ID: 463, TD18, 17:00-17:30, Panel #36

The challenge of Information and Communication technologies in the European Higher Education Area

VICENTE Maria Rosalia
QUINDOS Maria del Pilar
RUBIERA Fernando
PEREZ-GLADISH Blanca
University of Oviedo

Discussion presentation paper

Keywords: Education and Distance Learning

The Internet is changing the world we live in, and the challenge for Europe is to embrace the digital age and become a truly knowledge-based economy. In this context universities

have the challenge of modernising our education system to ensure digital literacy. Besides they are committed to the development of a coherent European Higher Education Area by 2010, as stated in the Bologna Declaration. In this sense the aim of this poster is to show some of the possibilities of the usage of Information and Communication Technologies in higher education and how to harmonize traditional and virtual teaching.

Paper-ID: 1376, TD18, 17:00-17:30, Panel #9

A PRELIMINARY WORK ON THE DEVELOPMENT OF A VIRTUAL SUPPLY CHAIN FRAMEWORK FOR SMEs IN TURKEY

CANYLMAZ Erdal
Erciyes Universitesi Turkey

BAYKASOGLU Adil
Gaziantep Universitesi Turkey

KUTAY Fevzi
Gazi Universitesi Turkey

Discussion presentation paper

Keywords: Supply Chain Management, Virtual enterprises, Web-based information systems

Small and middle sized enterprises (SME) have significant position in Turkey and world trade. The virtual partnership that will be formed among the members of the supply chains on the internet are going to provide the formation of an effective communication and efficient electronically commercial medium among these members. Extensible Forms Description Language (XFDL) is a highly-structured XML protocol designed to solve the body of problems associated with digitally representing paper forms on the internet. In this study, it is aimed to establish virtual partnerships being legally valid among the members of supply chain using the forms of XFDL.

Wednesday, July 7

WA02, 9:00 – 10:30 **Delphi Amphitheater**
Capacity Planning (C07)

Chair: MEISENBACHER John

Paper-ID: 279

Effective Performance Management for Transaction Prcoessing Systems

MEISENBACHER John

Contributed paper

Keywords: Capacity Planning, Finance and Banking

MasterCard has years of experience with large scale systems to support worldwide transaction processing. MasterCard uses stress testing and commercial capacity

planning software to support these systems. MasterCard also uses a technique of correlating transaction rates with workload in both production and test environments. This approach relies on daily transaction cycles to predict future capacity during seasonal and annual peak periods. This alternate technique provides better results at less cost than typical stress testing and commercial tools that do not take cyclic workload into account. Examples of how the technique has been used at MasterCard and resulting benefits are provided.

Paper-ID: 168

Capacity allocation in flexible manufacturing systems

BILGIN Selin
AZIZOGLU Meral
Faculty of Engineering Turkey

Contributed paper

Keywords: Capacity Planning, Flexible Manufacturing Systems

In this study, we consider a capacity allocation problem in flexible manufacturing systems. We assume the time and tool magazine capacities on the CNC machines and limited number of tools. Our problem is to allocate the available capacity of CNC machines to the required demand of the operations, so as to maximize the total weight overall assignments. We formulate the problem as Mixed Integer Linear Program and show that it is NP-hard. We develop Lagrangean based upper bounds and heuristic procedures. Our computational results have revealed that the Lagrangean relaxation and the heuristic procedures produce near optimal solutions.

Paper-ID: 370

E-POLCA to control multi-product, multi-machine job shops

CLAERHOUT Diederik
VANDAELE Nico
University of Antwerp Belgium

CREMMERY Rony
Spicer Off-Highway Products Division Belgium

VAN NIEUWENHUYSE Inneke
University of Antwerp Belgium

Contributed paper

Keywords: Capacity Planning, Queuing Systems

We report on the implementation of the new material control system Paired Overlapping Loops of Cells with Authorization (POLCA), which combines the advantages of push systems and pull systems. Therefore, we have to rely on a multi-product, multi-machine queueing network for the lead time determination (ACLIPS). We developed a load based version of the POLCA system. We report on our experiences in a metal shop, taken from Spicer Off-Highway Products Division, part of Dana Corporation. They implemented an E-POLCA system without paper based cards.

Parallel Sessions

Wednesday, July 7

WA03, 9:00 – 10:30 **Athena**
Graphs and Networks I (C41)

Chair: SCUTELLA' Maria Grazia

Paper-ID: 240
Balanced paths in acyclic networks
SCUTELLA' Maria Grazia
Universita' di Pisa Italy
CAPPANERA Paola
Universita' degli Studi di Firenze Italy

Contributed paper

Keywords: Graphs and Networks, Telecommunications, Transportation and Logistics

Given a weighted acyclic network G and two nodes s and t, we consider the problem of computing k balanced paths from s to t, i.e., k paths such that the difference between the longest and the shortest path is minimized. The problem has several applications in transportation and in telecommunication. We show that, whereas the general problem is solvable in pseudo-polynomial time, the arc-disjoint and the node-disjoint variants are strongly NP-Hard. We then address some significant special cases.

Paper-ID: 80
More on the Randiç index
PAVLOVIC Ljiljana
Faculty of Natural Sciences and Mathematics Serbia and Montenegro

Contributed paper

Keywords: Combinatorial Optimization, Graphs and Networks, Programming, Linear

Let G be a connected graph without multiple edges and loops which has n vertices and the minimum degree of vertices is k. The Randiç index is the summation of d(u)d(v) raised to -1/2, where d(u) is the degree of vertex u and the summation extends over all edges . In this paper we found the extremal graphs for the Randiç index when the number of vertices of degree k is n-k+t, for t between 0 and k.

Paper-ID: 1544
Extension of coloring models for scheduling problems
AZIMI Fatemeh
Iran, Islamic Republic Of
NAJAFI Amir Abbas
SHARIF UNIVERSITY OF TECHNOLOGY Iran, Islamic Republic Of

Contributed paper

Keywords: Graphs and Networks, Scheduling

Some extensions and variations of basic chromatic scheduling models have been motivated by applications in automated production systems and other scheduling problems. In this paper, we review application of graph coloring models in scheduling problems.

Paper-ID: 1668

Distance and preservation in graphs

MEZIANE Aider
Algeria

Contributed paper

Keywords: Graphs and Networks

A distance-hereditary graph is a connected graph such that the distance between any pair of non-adjacent vertices of any connected induced subgraph is the same that the distance between these vertices in the original graph. The class of distance hereditary graphs can be extended in several ways. Indeed, we can allow a little increase of the distance and construct several classes of graphs. Some of these classes can be characterized by forbidden induced subgraphs.

WA04, 9:00 – 10:30 Salon des Roses A

EWG MCAD: MCAD and Artificial Intelligence II (O09b)

Chair: SLOWINSKI Roman

Paper-ID: 1244

Logical Method for Aggregation of Individual Preferences

LEVIN Vitaly
Russian Federation

Paper in an organized session

Keywords: Decision Theory and Analysis, Group Decision Making and Negotiation, EWG MCAD Multi-Criteria Aid for Decision

Let we have two objects A and B to which m experts give m different evaluations p1,..,pm and q1,..,qm. Then the choice of the best objects reduces to comparison and the following choice of the biggest of evaluation vectors P=(p1,..,pm) and Q=(q1,..,pm). The principal difficulties is that only at pi>qi, i=1,..,m is clear, that P>Q and, hence, A is better than B. In the rest of the cases vectors P and Q comparison is problematic. So, we'll compare vector not by components, but as the whole, introducing a formal operation of comparison (taking maximum and minimum) of two vectors.

Paper-ID: 1126

An Interactive Optimisation and Decision Making Procedure for Production Scheduling

GEIGER Martin Josef
United Kingdom

PETROVIC Sanja
University of Nottingham United Kingdom

Paper in an organized session

Keywords: Metaheuristics, Scheduling, EWG MCAD Multi-Criteria Aid for Decision

Many complex real-world problems are difficult to model using a fixed set of criteria. Decision making situations dynamically change, and different objectives may be of

relevance over time. It requires a model being able to adapt to occurring changes, integrating relevant aspects if necessary. We describe a methodology for multi-criteria optimisation, allowing the decision maker to introduce or redefine criteria over time. The search is interactively guided towards preferred regions of the search space, subsequently adding preferences to the model. The methodology is based on an evolutionary algorithm and applied to a real-world production scheduling problem in a printing company.

Paper-ID: 1645

A characterization of concordance relations

PIRLOT Marc
Faculté Polytechnique de Mons Belgium

BOUYSSOU Denis
CNRS-LAMSADE France

Contributed paper

Keywords: Decision Theory and Analysis, Multi-Criteria Decision Aids, Multi-Objective Decision Making

The notion of concordance is central to many multiple criteria techniques relying on ordinal information, e.g. outranking methods. It leads to compare alternatives by pairs through comparing coalitions of attributes in terms of "importance". This note proposes a characterization of the binary relations that can be obtained using such comparisons, within a general framework for conjoint measurement that allows for intransitive preferences. We show that such relations are mainly characterized by the very rough differentiation of preference differences that they induce on each attribute. Our results are compared with other approaches to the analysis of concordance.

WA05, 9:00 – 10:30 **Salon des Roses B**

Group Decision Making and Auctions I (C06a)

Chair: VULCANO Gustavo

Paper-ID: 1357

Online Auction and List Price Revenue Management

VULCANO Gustavo
CALDENTEY Rene
New York University United States

Contributed paper

Keywords: Auctions / Competitive Bidding, Revenue Management and Pricing

We analyze a revenue management problem in which a seller, facing a Poisson arriving stream of rational customers, operates an online multi-unit auction. The seller announces the auction duration, the reservation price, and the number of units to offer in order to maximize revenues. Besides the auction, customers have access to an alternative list price channel to buy the product. This list price channel can be either managed by the auctioneer or by another firm.

Paper-ID: 56

An Electronic Auction for Financing of Public Goods - the Equilibrium Conditions

JAKUBOWSKI Andrzej
Systems Research Institute, Polish Academy of Sciences Poland

Contributed paper

Keywords: Auctions / Competitive Bidding, Game Theory, Group Decision Making and Negotiation

The idea of electronic auction for the choice of quantity and financing of the public non-divisible goods is considered. It is assumed that the auction participants differ in their opinions on the amount of the public good to be produced as well as on the share of total cost. The computer-aided auction (negotiation) procedure is formulated in the form of N-person game. Two types of equilibrium solutions to such a game are discussed. The examples, illustrating the so-called free-rider - versus the Lindahl-behaviour of the auction participants are presented. The graphical illustration of the equilibrium solutions is also given.

Paper-ID: 450

An Extension of NegotiAuction to Multi-Unit Combinatorial Bundle Auctions

LESKELA Riikka-Leena
WALLENIUS Hannele
Helsinki University of Technology Finland

TEICH Jeffrey
New Mexico State University United States

WALLENIUS Jyrki
Helsinki School of Economics Finland

Contributed paper

Keywords: Auctions / Competitive Bidding, Decision Support Systems

We consider multi-unit combinatorial bundle auctions and extend NegotiAuction, a progressive hybrid multiple-issue auction and negotiation system, to such a situation. An interesting feature of our combinatorial auction is the possibility to provide quantity support to bidders, that is suggestions regarding what would constitute good bids from the bidders' point of view. Computational results testing the quantity support feature are discussed both in the linear programming (partial bids accepted) and integer programming (partial bids not accepted) contexts.

WA06, 9:00 – 10:30 Nafsica A
Production & Inventory Systems II (C68)

Chair: TEMPELMEIER Horst

Paper-ID: 229

Supply chain inventory optimization with two customer classes in discrete time

TEMPELMEIER Horst
University of Cologne Germany

Contributed paper

Keywords: Supply Chain Management

We consider a single-item inventory system where two demand classes with different service requirements are satisfied from a common inventory. A critical level, reorder point-order quantity (s,q,k)-policy is in use. The time axis is divided into discrete time units. Approximations are developed for the demand class-specific fill rates and the probability distribution of the waiting time of low priority customer orders.This waiting time distribution is used for the determination of the safety stock allocation in a two-stage supply chain.

Paper-ID: 379

Optimal Base Stock Ordering Under Budgetary Constraint

HAJI Rasoul
HAJI Alireza
Sharif University of Technology Iran, Islamic Republic Of

BAGHERZADEH Majid
Azad University Iran, Islamic Republic Of

Contributed paper

Keywords: Production and Inventory Systems, Stochastic Models

In this paper we consider a base stock inventory system in which upon arrival of each costumer an amount equal to his demand is ordered. We assume the unit inventory holding cost and the unit shortage cost of the product per unit time is constant and the backorder case is used. For this inventory system, we obtain the optimum inventory position of the product such that the expected total inventory holding cost and shortage cost of product per unit time is minimized.

Paper-ID: 201

A simple method for choosing the optimal quality

DEME Roland
VIZVARI Béla
Eötvös Loránd University Faculty of Sciences Hungary

Contributed paper

Keywords: Production and Inventory Systems, Quality Management

In recent years the car industry made several efforts to reach the selling targets with the help of up-to-date qualities. Some of these new innovations can meet expectations others can not. In this paper we focused on the selection of optimal qualities. Our aim was to analyze the production of a car manufacturer, who can change the qualities of its products.

Paper-ID: 154

Inventory Management under Demand and Supply Uncertainty and Customer Service-level Requirements: Study of Single-Stage and Two-Stage (Serial,Assembly) Systems

BOLLAPRAGADA Ramesh
San Francisco State University United States

RAO Uday
University of Cincinnati United States
ZHANG Jun
Tulane University United States

Contributed paper

Keywords: Global Operations, Production and Inventory Systems, Supply Chain Management

In the first part of this talk, we examine a single-stage inventory system with demand and supply uncertainty, capacity limits and service level requirements. A stochastic program of the static, finite horizon problem is presented. For feasible instances, we develop optimal and heuristic solutions. In the second part, we consider a two-stage inventory system (serial, assembly) with demand and supply uncertainty, non-zero lead times, and a target customer service level. Both components and end-products follow installation base-stock policies. We characterize the relation between the different base-stock levels and present solution algorithms to compute optimal stock levels, using decomposition approaches.

WA07, 9:00 – 10:30 Nefeli B
Project Management and Scheduling II (C74)

Chair: VALLS Vicente

Paper-ID: 1047

Project length minimization in preemptive resource-constrained project scheduling

VALLS Vicente
University of Valencia Spain
BALLESTIN Francisco
Public University of Navarra Spain
QUINTANILLA Sacramento
University of Valencia Spain

Contributed paper

Keywords: Project Management and Scheduling

This paper deals with resource-constrained project scheduling when activities are allowed to be preempted at any integer time instant and restarted later on at no additional cost. We show how three basic widely-used techniques -the activity list representation of schedules, the serial schedule generation scheme and the justification- and therefore many heuristics for the classical RCPSP can be adapted to deal with preemption. The computational tests performed on the standard test sets j30 and j120 show that the introduction of pre-emption yields a significant reduction in the project length an assertion which is in contradiction with previous results.

Parallel Sessions

Wednesday, July 7

Paper-ID: 468

The Contribution of Project Management in Quality Assurance of Technical Projects

HATZIGEORGIOU Alexandros
University Of Macedonia Greece

Contributed paper

Keywords: Project Management and Scheduling, Quality Management

The basic concept of project management's philosophy, when implemented in technical projects, considers that the simultaneous optimization of the four characteristics of a project, object, cost, time and quality, is impossible, therefore the achievement of all the project's goals, including quality, at the maximum level, is unobtainable. Following the modern approach of a Quality Assurance System, this paper discusses the role of project management in compromising these competitive goals, in order to achieve the best possible relation. The two contradictory goals presented in this paper are construction cost and use value, demonstrated with two examples: design quality and completion time.

Paper-ID: 605

Scheduling the factory pick-up of new cars

TRAUTMANN Norbert
SCHWINDT Christoph
University of Karlsruhe Germany

MELLENTIEN Christoph
Institute for Economic Theory and Operations Research Germany

Contributed paper

Keywords: Combinatorial Optimization, Marketing, Project Management and Scheduling

Car manufacturers increasingly offer delivery programs for the factory pick-up of new cars. Such a program consists of a broad range of event-marketing activities. In this talk we investigate the problem of scheduling the delivery program activities of one day such that the sum of the customers' waiting times is minimized. We show how to model this problem as a resource-constrained project scheduling problem with non regular objective function, and we present a relaxation-based beam-search solution heuristic. This approach has been developed in cooperation with a German automaker.

Paper-ID: 1327

Project Valuation under Ambiguity

GUSTAFSSON Janne
SALO Ahti
Helsinki University of Technology Finland

Contributed paper

Keywords: Financial Modelling, Project Management and Scheduling, Risk Analysis and Management

This paper examines the valuation of risky projects in a setting where the investor's probability estimates are ambiguous and where she can invest in private projects as well as in financial markets. The Choquet-Expected Utility (CEU) model is employed to

capture ambiguity in probability estimates. Projects are valued using break even selling and buying prices, which are obtained by solving several mixed asset portfolio selection (MAPS) models. We formulate two MAPS models for CEU investors and prove several theorems concerning the valuation properties of CEU investors. The valuation procedure is demonstrated through numerical experiments.

WA08, 9:00 – 10:30 **Nafsica B**
Marketing (C51)

Chair: ZACCOUR Georges

Paper-ID: 690
Coop Advertising Programs under Competitive Market Structures

ZACCOUR Georges
GERAD & HEC Montreal Canada

KARRAY Salma
HEC Montréal Canada

Contributed paper

Keywords: Game Theory, Marketing

We examine whether cooperative advertising programs constitute an effective tool to coordinate competitive marketing channels. While previous studies showed that such programs increase total channel profits in bilateral monopolies, no evidence has been provided for channels where competition is present. We consider a distribution channel formed of two manufacturers and two retailers and propose a model that accounts for brand and store competitive interactions. The efficiency of the coop plan is investigated by comparing Nash equilibria of two non-cooperative games; one where manufacturers do not offer promotional support to retailers, and one where manufacturers do offer a support.

Paper-ID: 1471
Advertising for the introduction of an age-sensitive product

VISCOLANI Bruno
GROSSET Luca
University of Padova Italy

Contributed paper

Keywords: Marketing

An age-dependent market segmentation is often observed for real life products. We introduce a simple age-structured model for the advertising process of a firm and the consequent goodwill evolution. The model formal structure is characterized by a first order linear partial differential equation. The optimal advertising problem for a new product introduction is formulated in such a framework and solved using the suitable maximum principle conditions. Then the necessity of considering some inter-age communication possibilities leads us to generalize the original partial differential equation. To this end we exploit some analogies with known age-structured controls systems.

Paper-ID: 250

Incentive Strategies for Shelf-space Allocation in the Marketing

MARTIN-HERRAN guiomar
Universidad de Valladolid Spain

TABOUBI Sihem
HEC MONTREAL Canada

Contributed paper

Keywords: Game Theory, Marketing

We examine the issue of shelf-space allocation and advertising decisions in a marketing channel, where a unique retailer sells the brands of two competing manufacturers. The retailer controls a fixed amount of shelf-space to allocate to both brands. The manufacturers make advertising decisions in order to build their brand image and offer to the retailer a shelf-dependent incentive designed to induce him to allocate a higher share of the shelf to their brands. The problem is formulated as a Stackelberg differential game with the manufacturers as leaders and the retailer as the follower. Stationnary feedback equilibria are computed.

Paper-ID: 457

Customer relationship management in the banking industry via consumer profiling and product attribute matching

MAVRI Maria
IOANNOU George
Athens University of Economics & Business Greece

Contributed paper

Keywords: Forecasting, OR in Development

The banking industry now-days focuses on the customer and attempts to provide a wide array of products and services to its clientele. In this paper we define several generic attributes of banking products, which characterize any existing or under design offering to customers. Furthermore, we determine statistically significant variables for customer profiling. Subsequently, we develop an approach for designing new products and matching them with the existing customer base of a retail bank using optimization techniques that take into account profiles-attitudes, customer long-term value for the bank, and specific product attributes.

WA09, 9:00 – 10:30 — Jupiter (small)
Financial Modelling II (C33)

Chair: INUI Koji

Paper-ID: 709

The application of regime switching model to currency trading strategies

INUI Koji
Meiji University Japan

FUJINAKA Tomoaki
Kyoto University Japan

Contributed paper

Keywords: Financial Modelling, Forecasting, Simulation

We examine the application of regime switching model to currency investment such as currency overlay strategies widely hired by hedge funds or institutional investors. We characterize the currency exchange rates as two states Gaussian process, and its transition probability as to be constant or to be time varying with respect to observable state variables. Numerical comparison of constant transition probability regime switching model (CRSM) and time-varying transition probability regime switching model (TVRSM) are shown. The performance is significantly improved when interest rate spread changes are hired as state variables for TVRSM.

Paper-ID: 938

Evaluation of Correlation Forecasting Models For Risk Management

SKINTZI Vasiliki
XANTHOPOULOS Spyros
Athens University of Economics and Business Greece

Contributed paper

Keywords: Financial Engineering, Financial Modelling, Forecasting

Volatility and correlation forecasts are of paramount importance in modern risk management systems. The forecasting performance of volatility models in the context of risk management applications has extensively been investigated in the open literature. However, in spite of the plethora of correlation forecasting models, their impact on the VaR accuracy calculation has not yet been explicitly examined. In this paper, traditional and modern correlation forecasting techniques are compared using standard statistical loss functions, as well as, VaR based economic loss functions. Historical data on portfolios consisting of stocks, bonds, currencies and options are used for the purposes of this study.

Paper-ID: 940

The Relationship between the Market Impact function and the Portfolio Styles: Evidence from Tokyo Stock Exchange Firms

TAKEHARA Hitoshi
University of Tsukuba Japan

Contributed paper

Keywords: Financial Engineering, Financial Modelling

In this study, I construct a model to calculate the market impact and estimate the parameters in the model by using the tick-by-tick transaction data of individual securities listed on Tokyo Stock Exchange. I also examine the relationship between the portfolio styles and the shape of estimated market impact function. I find strong evidence that the average impact and the risk to execute the trade is much larger in the small/value firms than those in the large/growth firms.

Paper-ID: 955

MODELLING THE STOCHASTIC BEHAVIOR OF FX OPTIONS BASED ON AUTOREGRESSIVE CONDITIONAL DENSITY (ARCD) ESTIMATION

KOSTIKA Eleftheria
Athens University of Economics and Business Greece

Contributed paper

Keywords: Financial Modelling, Forecasting

The importance of volatility modeling is evidenced by the voluminous literature on temporal dependencies in financial market returns. A substantial body of this literature relies on explorations of daily and lower frequencies using parametric ARCH or stochastic volatility models. The objective of this research is to compare the model performance of the ARCD formulation to the conventional GARCH framework. We evaluate the forecasting performance of the density functions as applied to the daily behavior of five foreign currencies against USD. Also, we discuss about the formulation of a new model ARCD-Mean.

WA10, 9:00 – 10:30 **Nefeli A**

Management Information Systems and e-Marketing (C49)

Chair: YPSILANDIS Pandelis

Paper-ID: 1090

Spreadsheet-based Decision Support Systems: An efficient approach for building quantitative decision making skills for future managers

YPSILANDIS Pandelis
Technological Education Institute of Larissa Greece

Contributed paper

Keywords: Combinatorial Optimization, Decision Support Systems, Education and Distance Learning

This paper presents a quite different and we believe more efficient he approach in training business students and future managers on how to use quantitative decision-making methods for solving business problems. It is based on the use of spreadsheets but instead of following a model-oriented approach where given model structures are being represented in a spreadsheet environment, we suggest a problem-oriented approach, where more emphasis is given in exploring, understanding and structuring the problem, before solving it. It facilitates the development of useful skills in problem identification and analysis, prototype building, and exploring critical factors.

Paper-ID: 858

EVALUATING STUDENTS' SATISFACTION: A CASE STUDY

KOILIAS Christos
Greece

Contributed paper

Keywords: Education and Distance Learning, Multi-Criteria Decision Aids, Quality Management

Student satisfaction is of vital importance for every higher education institution because it promotes his internal reorganization, strengthen his image and emphasize on meeting the expectations and needs of students. The paper presents an original study that measures the students' satisfaction of an Informatics Department in Greece. A set of powerful ordinal regression methods has been applied on a survey database. The most important results are focused on the determination of the weak and the strong points of the department according to the MUSA methodology. Also, they are proposed suggestions for the improvement of the education quality.

Paper-ID: 1318

Tools for remote start-up business health monitoring

WILKER Helge
University of Magdeburg Germany

Contributed paper

Keywords: Entrepreneurship, Management Information Systems, Virtual enterprises

Startup companies often fail early. Staffs focus on technology and forget the business aspects of the firm. Modern business knowledge is too expensive to keep in-house or to buy as consulting. Financing problems due to lack of business information aggravate the situation. The internet allows continuous collection of business data from startup firms and application of modern business methods. We can perform business "health monitoring" remotely. Firms are embedded in a collaboration framework of business experts whose know-how they would otherwise not be able to employ. This framework is based on software, but must include personal relations as well.

Paper-ID: 977

What is Interactivity On line ? A literature review from DSS to e-Marketing.

STENGER Thomas
IAE de Poitiers France

Contributed paper

Keywords: Marketing, On line Market Research, Web-based information systems

Interactivity has been the buzzword of the early ages of e-commerce. Today_s web sites and on line customer relationships are they as interactive as previously announced ? The literature review carried out in this paper shows that the concept of Interactivity refers to various ideas or features whether it is used in Marketing, Decision Aid, or Information and Communication sciences. This review shows both the variety of definitions and their limits to conceive online customer relationship. The author purposes then to conceptualize Interactivity as part of online shopping and identifies various forms of Interactivity on line.

Parallel Sessions

Wednesday, July 7

WA11, 9:00 – 10:30 — Executive Room Alpha

Analytical Hierarchy Process I (C03)

Chair: SATO Yuji

Paper-ID: 764

Public-sector Reform: An Analytic Hierarchy Process Approach

SATO Yuji
Matsusaka University Japan

Contributed paper

Keywords: Analytic Hierarchy Process, Decision Support Systems, OR/MS and the Public Sector

The objective of this study was to propose the way to prioritize measures and policies of a local government in the process of public-sector reform. In the re-formation, delegating authorities from public sector to semipublic (or private) sector would be a crucial issue through the consequences; smooth empowerment, furthermore successful re-formation, is achieved by rational prioritization. In this study, the prioritization was implemented by the characterizations of public, semipublic and private sectors, and the evaluation of measures and policies of a local government. Both the characterizations and the evaluations were conducted using the Analytic Hierarchy Process.

Paper-ID: 443

A risk-based integrated AHP and goal programming framework for optimal allocation of internal auditing time to different projects

KRUGER Hennie
HATTINGH Giel
Potchefstroom University South Africa

Contributed paper

Keywords: Analytic Hierarchy Process, Decision Support Systems, Mathematical Programming

The optimal allocation of internal auditing time, based on risk, among numerous competing projects is a multi-criteria problem that includes both qualitative and quantitative factors. This paper discusses an integrated approach where the Analytic Hierarchy Process is used to deal with qualitative risk assessments and a goal programming model is then employed to distribute available hours in such a way that risk is minimised. Additional quantitative considerations such as maximum and minimum allowable project hours, risk reducing factors and acceptable risk levels are also taken into account. A brief case study is presented where the framework was empirically tested.

Paper-ID: 1091

The process of designing a Balanced Scorecard for a hospital unit

KARRA Eleni
Greece

PAPADOPOULOS Demetrios
University of Macedonia Greece

Contributed paper

Keywords: Analytic Hierarchy Process, Decision Support Systems, Health Care

The Balanced Scorecard is a performance management measurement tool that combines financial and non financial indicators in order to describe the present and the future of the organization. The successful implementation of the balanced scorecard depends heavily on the accurate definition of its metrics and their respective statistical weights. Analytical Hierarchy Process is used in the process of creation of a Balanced Scorecard: first for the selection of the most important metrics and second for the determination of their statistical weights. The purpose of this paper is to create a Balanced Scorecard for a Hospital Unit.

WA12, 9:00 – 10:30 **Executive Room Beta**

Continuous optimization II (O17)

Chair: TODOROV Maxim

Paper-ID: 182

Dual cones of convex semi-infinite systems

GOBERNA Miguel
Universidad de Alicante

Paper in an organized session

Keywords: Mathematical Programming, Programming, Nonlinear, EWG EUROPT Continuous Optimization Working Group

The reference cone of a linear semi-infinite system of weak inequalities allows testing its consistency. They are dual in the following sense: the solution set of a given system is contained in the solution set of another one if and only if the opposite inclusion holds for the respective cones. This talk defines dual cones to convex semi-infinite systems with possibly strict inequalities with the same objectives. In this case there exists also a topological duality between solution sets and dual cones. The dual characterizations of set containments have played key roles in solving large scale knowledge-based data classification problems.

Paper-ID: 314

Measuring the distance to ill-posedness of linear semi-infinite systems

LOPEZ-CERDA Marco A.
Alicante University Spain

CANOVAS Maria Josefa
PARRA Juan
TOLEDO Javier
Miguel Hernández University Spain

Paper in an organized session

Keywords: Mathematical Programming, Programming, Linear, EWG EUROPT Continuous Optimization Working Group

We consider the parameter space of all the linear inequality systems, in the Euclidean space and with a fixed index set, endowed with the topology of the uniform convergence of the coefficients. A system is ill-posed when small perturbations yield

both consistent and inconsistent systems The distance to ill-posedness constitutes a quantitative measure of the stability (and well-posedness) of the system and provides an ingredient in the complexity analysis of certain algorithms. We propose to apply the Fenchel-Legendre conjugate for measuring the distance to ill-posedness, and we provide a formula that gives account of the pathologies in the semi-infinite context.

Paper-ID: 147

Some interrelations between constraint qualifications in generalized semi-infinite programming

GUERRA Francisco
Universidad de las Americas, Puebla Mexico

Paper in an organized session

Keywords: Mathematical Programming, EWG EUROPT Continuous Optimization Working Group

The lecture deals with the class of generalized semi-infinite programming problems (GSIP). An extension of the so-called Kuhn Tucker constraint qualification (which is based on the existence of a tangential continuously differentiable arc) to the class (GSIP) is introduced, and a corresponding Karush-Kuhn- Tucker theorem is proved. Several examples which illustrate for (GSIP) some interrelations between the considered extensions of the Mangasarian-Fromovitz constraint qualification, the Abadie constraint qualification and the Kuhn-Tucker constraint qualification are presented.

WA13, 9:00 – 10:30 **Executive Room Gamma**
Urban traffic (C99)

Chair: MINIS Ioannis

Paper-ID: 586

CONTRIBUTION TO THE DESIGN OF THE ATHLETES' BUS NETWORK DURING THE ATHENS 2004 OLYMPIC GAMES

MINIS Ioannis
University of the Aegean Greece

ATHANASOPOULOS Theodoris
Technical University of Crete Greece

Contributed paper

Keywords: Network Design, Transportation and Logistics

This paper discusses the design of the transportation system for the Athletes of the Athens 2004 Olympic Games. This is not a typical mass transit network, due to the existence of a single origin for all routes, the dependence of the vehicle schedules from the competition and training schedules, and the requirement for 100% service reliability. The paper addresses the development of service level specifications, estimation of the bus fleet size, including the required sensitivity analysis with respect to travel times, and the development of vehicle schedules.

Paper-ID: 292

The Influence of One Road Segment on the Average Traveling Distance

LI Mingzhe
Fukuoka University Japan

Contributed paper

Keywords: Transportation and Logistics

The average traveling distance is an important index of urban traffic efficiency and thus, a lot of pioneering studies on this field have already been done by Vaughan, Koshizuka, etc. In this paper, we firstly describe the relation between SPCP, an existing study and an urban traffic model. Then, we give the average traveling distance based on the proposed model and SPCP. Continuously, we study the increase of the average traveling distance when one road segment is destroyed, so as to give the importance of one road segment on the studied traffic network when considering the average traveling distance.

Paper-ID: 392

A continuous model of time-dependent traffic flow with Euclidean distance: An analytical approach

TANAKA ken-ichi
KURITA Osamu
Keio University Japan

Contributed paper

Keywords: Transportation and Logistics

This paper presents an analytical method for calculating the continuous time-dependent traffic flow within a bounded region when a travelers' destination-arrival-time distribution is given. The major assumptions used in this study are the uniformly distributed endpoints of trips and the straight-line movement between these points. We aim to develop a simple geometric model which provides a macroscopic description of how the destination-arrival-time patterns of commuters influence spatio-temporal traffic distributions. To obtain some basic properties of our model, we present some results calculated in regions of simple geometric shapes. We also present results calculated in existing cities.

Paper-ID: 495

The estimation of urban traffic condition using an Automatic Vehicle Location System.

D'ACIERNO Luca
CARTENI Armando
MONTELLA Bruno
PINTO Davide
Universitá degli Studi di Napoli "Federico II" Italy

Contributed paper

Keywords: Management Information Systems, Simulation, Transportation and Logistics

This work proposes the use of buses, equipped with an Automatic Vehicle Location System, as probe in the traffic in order to estimate traffic flow conditions in real time. The aim of this

paper is the implementation of a method to estimate road network performances through a function that joins bus travel time and car travel time. The results demonstrate the robustness of the model in describing the status of the road transportation system. Research perspectives can be addressed to the definition of network control strategies and to the emergency management using the proposed methodology.

WA14, 9:00 – 10:30 **Executive Room Delta**
Reliability and Risk Analysis (C78)

Chair: TUMBAS Peter

Paper-ID: 814
MANAGEMENT RELIABILITY ANALYSIS METHOD BASED ON NATURAL LANGUAGE

TUMBAS Peter
Faculty of Economics Serbia and Montenegro

SEDLAK Otilija
ECONOMIC FACULTY SUBOTICA Serbia and Montenegro

Contributed paper

Keywords: Fuzzy Sets and Systems, Reliability

This paper should be an attempt of analyzing management reliability method with natural language. In this case we prefer analyze by linguistic terms than by numerical values. The characteristics of this method are: (1) linguistic expressions of information on management reliability are used; (2) the meaning of linguistic expression is expressed by a fuzzy set defined on a unit interval [0,1]; (3) the parametrized operations of fuzzy sets are used in order to reflect analyst's subjectivity towards analyzed management tasks; (4) task dependence and procedure are considered, which are peculiar to human reliability, (5) analysis results are expressed linguistic expressions.

Paper-ID: 822
APPLICATION OF RISK ANALYSIS AND FMEA METHOD DURING VEHICLE LIFE CYCLE

POPOVIC Vladimir
VASIC Branko
MITIC Sasa
Faculty of Mechanical Engineering Serbia and Montenegro

Contributed paper

Keywords: Critical Decision Making, Reliability, Risk Analysis and Management

This paper shows how Failure Modes and Effects Analysis, which has been widely applied in other areas, can be used as a link between numerical simulation and experimental activities throughout design and development process. This is illustrated by the example of bus superstructure development. We have paid a great deal of attention to risk analysis and direct inclusion of this parameter into the known FMEA method, insisting on the inconsistencies of the traditional FMEA method. The result of our efforts is a new, improved approach to motor vehicle failure analysis, which introduces a new dimension into the whole process.

Paper-ID: 1048

Risk Management in Hierarchical Advisory System in Construction Industry

PASLAWSKI Jerzy
Poland

Contributed paper

Keywords: Analytic Hierarchy Process, Decision Support Systems, Risk Analysis and Management

A concept of risk and uncertainty management has been presented, whereby small electronic devices are used within the framework of a hybrid advisory system, supporting technological decisions in construction. The hierarchical approach which has been assumed (three levels of management have been identified). The case study points at the significance of uncertainty and risk management at the operational level (which, similarly, results from specific character of construction industry). The notions of system oriented uncertainty and risk management have been proposed using the ON-LINE CONCRETE concept, which may reduce uncertainty thanks to tele-transmitting data on-line.

Paper-ID: 556

Simulation with RESTART of Two-Stages Networks

VILLÉN-ALTAMIRANO José
Universidad Politécnica de Madrid Spain

Contributed paper

Keywords: Network Design, Queuing Systems, Simulation

The method RESTART is an efficient alternative for rare event simulation. A number of simulation retrials are performed when the process enters regions of the state space where the chance of occurrence of the rare event is higher. The optimal number of regions and retrials have been obtained in previous papers, but remain the problem of obtaining an appropriate importance function to define the regions. In this paper we obtain efficient importance functions for networks with two stages and different nodes in each one. The same ideas could be applied for other networks.

WA15, 9:00 – 10:30 VIP Lounge
Data Mining (C21)

Chair: BRANDL Bernd

Paper-ID: 1332

A GENETIC ALGORITHM AND DOMAIN KNOWLEDGE FROM ECONOMIC THEORY: THE CASE OF EXCHANGE RATE FORECASTS

BRANDL Bernd
University of Vienna Austria

Contributed paper

Keywords: Data Mining and Data Base Modeling, Economic Modeling, Forecasting

This paper focuses on an integration of exchange rate theory in a genetic algorithm for the purpose of forecasting. It is asked how a genetic algorithm can increase the

forecasting performance of theoretical models. Therefore structural exchange rate models are implemented in a genetic algorithm as a framework in which alternative variables of aggregates suggested by exchange rate theory are optimized. It is shown that this combination of economic theory and machinery learning not only increases the 'fitness' of theoretical exchange rate models but is also fruitful for the effectiveness and correctness of machine learning processes.

Paper-ID: 609

A Mathematical Method for Mining Machines Quality Evaluation

MILICIC Milos
Serbia and Montenegro

Contributed paper

Keywords: Data Mining and Data Base Modeling

This paper presents a quality evaluation method for the selection of mining machines under given working conditions. The evaluation is based on technical characteristics of the machines and it is conducted by applying various sinstict functions.

Paper-ID: 696

Expert System Support in Data Mining Method Selection

BOSHNJAK Zita
BOSHNJAK Sasa
Faculty of Economics Serbia and Montenegro

Contributed paper

Keywords: Artificial Intelligence, ES and Neural Networks, Data Mining and Data, Base Modeling

Data mining is a confluence of disciplines and consequently it uses a full spectrum of techniques. Furthermore, depending on the kinds of data to be mined or on the given data mining application, the data mining system may also integrate techniques from respective fields. There are still no established criteria for deciding which data mining methods to use in which circumstances. However, there are some approaches based on heuristic approximations. In this paper we described one expert system that helps potential users distinguish data mining systems and identify those that best match their needs.

Paper-ID: 1520

Vector DNF for Datasets Classification: Application to the Financial Timing Decision Problem

SCOZZARI Andrea
Facoltá di Economia

LIQUORI Massimo
Universitá di Roma "La Sapienza" Italy

Contributed paper

Keywords: Data Mining and Data Base Modeling, Decision Support Systems

In the area of knowledge-based expert systems the aim is to detect structural information from large datasets in order to identify salient features that separate one set of data from another. The traditional classification approaches consider the dataset

formed by an archive of observations classified as positive or negative according to a binary classification rule. In the Financial Timing Decision problem a ternary classification is recommended. In our work we provide a method based on LAD technique to obtain such a ternary classification. We test our technique on time series of Mib30 stock exchange market in Italy.

WA18, 9:00 – 10:30 — Jupiter Lobby
Discussion Presentations VII

Paper-ID: 1679, WA18, 09:00-09:30, Panel #1

ESTIMATION OF TOLL PRICES ON BUILD – OPERATION – TRANSFER (BOT) PROJECTS WITH THE USE OF THE MULTI-PARAMETRIC MODEL

CHRISTAKOS Evangelos
KALFAKAKOU Glykeria
LATINOPOULOS Perikles
ARISTOTLE UNIVERSITY OF THESSALONIKI, Greece

Discussion presentation paper

Keywords: Economic Modeling, Engineering Management, Financial Engineering

BOT projects are distinguished by the difficulty in attracting investors. The uncertainties concerning the construction and the operation process of the programme alike raise difficulties in the application of the B.O.T. projects. For collaboration between the Public and the Private sector, it is essential to know the attractiveness and the viability of the investment. Especially at the transport projects, the most important parameter is the price of the tolls. In this study this price is calculated through a multi-parametric analysis which takes into consideration the total duration of the concession and the return on equity fund (ROE).

Paper-ID: 171, WA18, 09:00-09:30, Panel #15

EXPLICIT MULTIOBJECTIVE ANALYSIS FOR RISK ANALYSIS IN NATURAL RESOURCES

RAVE Claudia Cristina
SMITH Ricardo
VELEZ Jaime Ignacio
BOTERO Veronica
Universidad Nacional de Colombia Colombia

Discussion presentation paper

Keywords: Disaster and Crisis Management, Environmental Management, Sustainable Development

A multi-objective methodology for the zonation of natural risks in urban river basins is presented based on the combination of specific natural hazards with related vulnerability indicators to estimate the specific natural risk for that hazard. The methodology is supported in a geographical information system and is based on the construction of maps for the natural hazards and the related specific vulnerabilities, that are then combined by means of multi-objective decision rules. Some results for the case of a urban river basin in Medellin, Colombia, are presented.

Parallel Sessions

Wednesday, July 7

Paper-ID: 865, WA18, 09:00-09:30, Panel #22

A self-adaptive mutation operator based on Pareto ranking

ALBERTO MORALEJO Isolina
MATEO Pedro
Universidad de Zaragoza Spain

Discussion presentation paper

Keywords: Artificial Intelligence, ES and Neural Networks, Metaheuristics, Multi-Objective Decision Making

Self-adaption capacity is an important element in evolutionary algorithms. Self-adaption properties have been explored in numerous algorithms: evolution strategies, evolutionary programming, genetic algorithms, .., . We present a self-adaptive mutation operator in the context of MOEA's. In contrast to other operators, the dynamic behaviour of our mutation operator is based on the Pareto ranking of the population individuals and it manages the size of the mutation in terms of the Pareto layer of the individual. It can be parameterized to present different behaviours during the algorithm. This operator is compared with three usual operators: random mutation, non-uniform mutation and polynomial mutation.

Paper-ID: 1098, WA18, 09:00-09:30, Panel #29

Political Districting via Weighted Voronoi Regions

RICCA Federica
SIMEONE Bruno
LARI Isabella
University of Rome La Sapienza Italy

Discussion presentation paper

Keywords: Graphs and Networks, Multi-Objective Decision Making, OR/MS and the Public Sector

The design of electoral districts is one of the critical issues in political elections. Political districting can be modelled as multi-objective partitioning of a graph into connected components, where population equality and compactness must hold if a majority voting rule is adopted. This leads to the formulation of problems extremely hard to solve exactly. We propose a heuristic method which exploits discrete weighted Voronoi regions in order to obtain compact and balanced districts. The performance of our algorithm has been tested on real benchmarks and experimental results are provided.

Paper-ID: 469, WA18, 09:00-09:30, Panel #36

Measuring accuracy of demand approximation in a two-echelon inventory system with lost sales

SEIFBARGHY Mehdi
Sharif University and Azad University of Qazvin Iran, Islamic Republic Of

AKBARI JOKAR Mohammad Reza
Sharif University of Technology Iran, Islamic Republic Of

Discussion presentation paper

Keywords: Supply Chain Management

We consider a two echelon inventory system consists of one central warehouse and an arbitrary number of retailers. The inventory control policy is assumed to be as continuous

review in all installations. We assume the demand processes in all retailers to be as independent poissons and when incurred stockouts in each retailer, the unsatisfied demand is lost. We also assume when incurred stockouts in the warehouse, the unsatisfied demand is back-ordered in the warehouse. We approximate mean rate of demand in the warehouse assuming demand process to be poisson and then compare our approximation with simulation.

Paper-ID: 1528, WA18, 09:00-09:30, Panel #8

Study of the congestion for the dimensioning of a telephone network

HAMITI Djazira
ATMANI Taos Rosa
Algeria

AISSANI Djamil
ADJABI Smail
Laboratory LAMOS Algeria

Discussion presentation paper

Keywords: Reliability, Telecommunications

In this work, we have study the congestion problem of a switcher in a telephonic system in the objective of dimensioning some transmission canals of a network. The congestion in a telephonic system refers to the situation where the calls can't be treated directly for a lack of equipment. For the evaluation of congestion, we have considered the Erlang model with lost calls. The dimensioning policy consists of determining the number of lines to install and the limit number of users so that the probability of congestion in the network is lower than a specified probability threshold.

Paper-ID: 179, WA18, 09:30-10:00, Panel #16

Economic Modelling of Fiscal Federalism in Monetary Unions

WALLENIUS Johanna
Finland

Contributed paper

Keywords: Economic Modeling

The original theory of optimum currency areas ignores fiscal policy. This study analyzes how to incorporate fiscal aspects into a monetary union framework. The key objective is to study how to model fiscal federalism and to analyze the welfare implications of international income transfers in monetary unions. I extend a two-country, overlapping generations model to the case of fiscal federalism. The analysis uses a multiple agent, multi-stage optimization framework.

Paper-ID: 864, WA18, 09:30-10:00, Panel #23

DESIGNING EFFECTIVE INVESTOR RELATIONS SERVICE WEB SITES FOR E-MARKETING

ATSALAKIS George
Greece

GRIGORIOU Pantelis
Technical University of Crete Greece

Discussion presentation paper

Keywords: Marketing, Web-based information systems

In this paper, the use of the Internet is analysed as a modern and effective channel for information distribution for e-marketing of stocks. We present the distribution channels in stock-exchange markets and how management can broaden the role of the Internet on behalf of their share owners interests. We analyze the results of our research of companies with the largest market-capitalization worldwide, which are listed in the most mature Stock-Exchanges. This research presents the quantity and quality of investor-relations information distributing via the Internet, and proposes the use of investor-relations electronic services under the scope of an effective web-site designing framework

Paper-ID: 492, WA18, 09:30-10:00, Panel #30

Application Interconnection and Execution of Business to Business Transactions over the Internet

CHARALABIDIS Yannis
Singular Software SA Greece

SPINELLIS Diomidis
Athens University of Economics and Business Greece

Discussion presentation paper

Keywords: Enterprise Resource Planning Systems, Management Information Systems, Web-based information systems

The paper presents an approach towards executing transactions between enterprises, governmental bodies and banking institutions, based on ERP applications connected over the Internet. Our work builds on a review of current XML standards for representing business processes and data (e.g. ebXML, UN/EDIFACT, RosettaNet) as well as standards for the technological deployment of such solutions (CORBA, .net, J2EE). Next, using proven enterprise modeling methodologies, we formally describe key inter-enterprise transactional processes. In addition, we define application-neutral protocols, electronic data formats, and messages for interoperating applications. Finally, we develop a server-based system for managing electronic transactions, such as e-invoicing, e-VAT, and e-payment.

Paper-ID: 1122, WA18, 09:30-10:00, Panel #37

WEB-BASED DECISION SUPPORT: THE CASE FOR LITHUANIA

ZAVADSKAS Edmundas
KAKLAUSKAS Arturas
Vilnius Gediminas Technical University

Discussion presentation paper

Keywords: Decision Support Systems, Human Centred Processes, Multi-Criteria Decision Aids

Web-based decision support systems (innovation, sustainable urban development, construction, real estate, facilities management, international trade, refurbishment, etc.) as was created by the authors in cooperation with their associates are described in this paper. When creating the Web-based decision support systems the authors based their work on the following major principles and methods: method of complex analysis, method of functional analysis, principle of cost-benefit ratio optimisation, principle of interrelation of various sciences, methods of multi-variant design and multiple criteria

analysis, principle of close interrelation between project's efficiency and interested parties and their aims.

Paper-ID: 1533, WA18, 09:30-10:00, Panel #9

Models for Multi-Product Multi-Constrained Inventory Systems

HAKSEVER Cengiz
MOUSSOURAKIS John
Rider University United States

Discussion presentation paper

Keywords: Production and Inventory Systems, Programming, Integer, Programming, Linear

This paper presents the results of computational experiments with two mixed integer programming models for optimizing multi-product multi-constrained inventory management systems.

Paper-ID: 1428, WA18, 10:00-10:30, Panel #10

Organizing Data Collection in Health Records

AHMADIAN leila
KHAJOUEI reza
kerman medical sciences university Iran, Islamic Republic Of

Discussion presentation paper

Keywords: Health Care, Information Retrieval – filtering, Management Information Systems

Three basic formats for organizing data in patient’s record have been designed: 1-Source-oriented Medical Record: in this format the record is organized into sections according to the data collection. Within each section, sheets are arranged in chronological order. 2-Problem-oriented Medical Record: in this format the data can be organized according to the patient’s problem. This format focuses on the documentation of a logical, organized plan of clinical though by practitioners. 3-Integrated Medical Record: Integrated records are arranged in strict chronological order, regardless of the source of the information. These structures can use in paper-based medical record and computer-based patient record.

Paper-ID: 661, WA18, 10:00-10:30, Panel #17

CDM - PAT: The e-tool steering towards the reduction of CDM transaction costs

FLAMOS Alexandros
DOUKAS Haris
PATLITZIANAS Konstantinos
PSARRAS John
National Technical University of Athens Greece

Discussion presentation paper

Keywords: Decision Support Systems, Multi-Objective Decision Making, Sustainable Development

One of the major barriers hampering the wide spread implementation of CDM (Clean Development Mechanism) is the high transaction costs associated with the initial identification of promising CDM projects. This paper presents the CDM - PAT (Pre -

Assessment Tool); a freely accessible web based project assessment tool, which incorporates 4 pre assessment stages (typical eligibility, viability, additionality and sustainability check). The CDM-PAT provides e-services to potential CDM investors, to host countries and to CDM funding organizations. The intuitive menus and the user friendly environment will facilitate even users who are unfamiliar with the CDM procedures and modalities.

Paper-ID: 553, WA18, 10:00-10:30, Panel #24

Improving the Quality of Satisfaction Measurements using LP Post-Optimality Analysis

TSOTSOLAS Nikos
SISKOS Yannis
University of Piraeus Greece

Discussion presentation paper

Keywords: Marketing, Programming, Linear, Quality Management

Many customer satisfaction measurements may reveal different sets of customers in which similar attitudes towards products and services are observed. A post-optimality analysis on the linear programming algorithms, which are used in the methodology MUSA (MUlticriteria Satisfaction Analysis), may lead to an "a posteriori" segmentation of the initial total set into smaller and more homogeneous subsets. A C++ application was developed, aiming to an overall approach of the above problem. This software was used on data sets from real-world customer satisfaction surveys. Several conclusions came out concerning the impact of different MUSA parameters to the quality of the results.

Paper-ID: 1551, WA18, 10:00-10:30, Panel #3

Supply Chain Management Software Selection in a Fuzzy Environment

OZMEHMET Seren
Turkey

TASAN Serdar
Dokuz Eylul University

Discussion presentation paper

Keywords: Analytic Hierarchy Process, Fuzzy Sets and Systems, Supply Chain Management

This study deals with the selection of Supply Chain Management(SCM) software among alternatives in a fuzzy environment. The main purposes of the usage of such SCM software are to reduce costs, inventory level, cycle times; to increase flexibility over supply chain; to improve responsiveness and forecasting capability in the functions of SCM. Analytic Hierarchical Process(AHP) is a well-known procedure for solving multi-criteria decision problems. Because of the fuzzy nature of the comparison processes decision-makers prefer interval judgments than fixed value judgments. And in this study fuzzy AHP is employed for SCM software selection, as a multi-attribute decision making methodology.

Paper-ID: 1139, WA18, 10:00-10:30, Panel #38

M-commerce services as a tool for competitive advantage: an empirical study in Cyprus tourism

KOKKINAKI Angelika
Intercollege

PARKHOMENKO Oxana
Infotrend Innovations Co Cyprus

Discussion presentation paper

Keywords: Mobile e-services, On line Market Research, OR for Electronic Services

In this paper we examine the potentials of m-commerce services in the tourism industry in Cyprus. We identify the actors in the value chain introduced by m-commerce tourism-related services in Cyprus, the key enabling factors and the highly sought attributes in m-services. The methodology applied combines both quantitative and qualitative research: we have concluded a series of interviews with key actors in Cyprus tourism (CTO, Cyprus Airways, travel agents, hotel chains etc) and we have conducted a large scale survey among visitors in the island regarding their perspective and priorities for tourism related m-services.

WC02, 14:00 – 15:30 — Delphi Amphitheater
Software for OR/MS Analysis (C102)

Chair: FOURER Robert

Paper-ID: 1536

Developments in the Design and Operation of the NEOS Server

FOURER Robert
United States

MORE Jorge
Mathematics and Computer Science Division United States

MUNSON Todd
SARICH Jason
Argonne National Laboratory United States

Contributed paper

Keywords: OR and the Internet, Software for OR/MS Analysis, Web-based information systems

Enhancements to the NEOS Server are making optimization methods available over the Internet to an increasingly large audience. New utilities assist users in problem analysis and solver selection, and perform benchmark tests automatically. Submissions can be made from a growing variety of modeling environments to an increasingly varied lineup of general and specialized solvers. We survey these developments as well as others currently underway.

Paper-ID: 1229

Strategic Open Software in Operations Research

BLANAS George
Greece

Contributed paper

Keywords: OR in Development, Software for OR/MS Analysis, Strategic Planning and Management

Certain types of software play a strategic role in the development of the various aspects of organizational life. In the paper we review the characteristics and the types of strategic software in the field of Operations Research, we summarize the ethnographic evolution of strategic software development in Operations Research, and we examine the hypothesis on whether and how the existing open software paradigm can assist in the process of closing the knowledge gap. Finally, we propose policies for strategic open software development in Operations Research and we identify areas for further research.

Paper-ID: 1535

Optimization in Distributed Applications. Web-based services with XML and SOAP

KRISTJANSSON Bjarni
Maximal Software, Ltd United Kingdom

Contributed paper

Keywords: Large Scale Optimization, Mathematical Programming, Software for OR/MS Analysis

In this presentation we will explore how innovative new technologies, such as XML and SOAP, are creating new opportunities for solving optimization problems within distributed applications. We will demonstrate how optimization and modeling services can be packaged into component libraries based on industry standards such as ActiveX/Com and JavaBeans. This allows seamless integration of optimization into easily maintainable applications.

WC03, 14:00 – 15:30 — Athena
Graphs and Networks II (C42)

Chair: KEREN Baruch

Paper-ID: 66

Planning the Most Parallel Processing of Directed Acyclic Graphs

KEREN Baruch
LASLO Zohar
ILANI hagai
Negev Academic College of Engineering Israel

Contributed paper

Keywords: Combinatorial Optimization, Parallel Algorithms and Implementation, Project Management and Scheduling

A directed acyclic graph with the cumulative spread-out workload is pre-given. We assume a same unit processing capacity on each arc and total flexibility in redistributing

the cumulative spread-out workload among the arcs. The problem is how to distribute the cumulative spread-out workload within the graph arcs in order to minimize its critical path. We use the Dilworth Theorem to get an efficient algorithm (polynomial) to the problem. The result is a useful lower bound to any process that can be formulated as a directed acyclic graph, such as parallel multiprocessor computing, manufacturing networks and project networks.

Paper-ID: 613

Learning Bayesian Networks from Data: A New Algorithm

MARTINEZ RODRIGUEZ Ana
University of Jaen

Contributed paper

Keywords: Cross-Entropy, Graphs and Networks, Network Design

Large databases store great amount of information. For this information to be useful to researchers it has to be interpreted. A graphical model of the probabilistic relationships between the domain variables is a Bayesian network that constitutes an efficient device to perform probabilistic inference. In this work we apply a new algorithm to design the structure of the ALARM, the most widely used benchmark in this area. We define a new score of the structure of a network, then we maximize this measure in the space of structures of Bayesian networks by means of a new to phase algorithm.

Paper-ID: 1317

Gathering results on hamiltonicity and hamiltonicity of the join graph of the (0,2)-graph

BEKKAI siham
Algeria

ZINEB Benmeziane
Univerite des sciences et de la technologie Houari Boumedienne Algeria

Contributed paper

Keywords: Combinatorial Optimization, Graphs and Networks

The communication we propose is divided into two parts. In the first one, results on hamiltonicity using conditions on degrees; closure; stability number; toughness and forbidden configurations are gathered in a survey. The presentation of this survey is motivated by the several developments that the hamiltonian field has known. In the second part, we take an interest in a particular operation that associates to any graph G its join graph G*. The join of a (0,2) graph is a (0,2) graph. We verify whether the join graph of an hamiltonian (0,2) graph is hamiltonian, generating so other hamiltonian (0,2) graphs.

Paper-ID: 1214

The Complexity of Maximum Integer Multi-flow Problems in Eulerian Networks

ILANI Hagai
Negev Academic College of Engineering Israel

BARSKY Evgeny
NACE Israel

Contributed paper

Keywords: Combinatorial Optimization, Complexity and Approximation, Graphs and Networks

Given two graphs G and H so that V(H) is a partial set of V(G), we call the problem of finding maximum number of edge-disjoint paths in G , each connecting two adjacent vertices of H , the (G,H)-Max problem. It is proven that the (G,H)-Max problem is NP-Hard when the graph G is Eulerian and H is fixed and has 3 intersecting maximal stable sets of vertices A,B,C so that the intersection of A and B is different from the intersection of A and C.

WC04, 14:00 – 15:30 Salon des Roses A
EWG MCAD: Multi-Criteria Decision Aid Theory (O01)

Chair: FIGUEIRA José

Paper-ID: 1595

Bipolar capacities in modeling noncompensatory preferences

GRECO Salvatore
MATARAZZO Benedetto
Faculty of Economics - University of Catania Italy

SLOWINSKI Roman
Poznan University of Technology Poland

Paper in an organized session

Keywords: Decision Theory and Analysis, Multi-Criteria Decision Aids

Non compensatory preferences (Fishburn 1976) consider preferences between actions x and y based on the comparison of the importance of criteria in favour of x and the importance of criteria in favour of y. Here we give an axiomatic basis to a non compensatory preference structure which keeps the same spirit of the non compensation as proposed by Fishburn. Moreover, we show how bipolar capacities can be used to model non compensatory preferences. Finally, we introduce bipolar decomposability of importance of criteria and characterize it by means of a specific independence property of weak preference relation.

Paper-ID: 1589

DEALING WITH INTERACTIVITY BETWEEN BIPOLAR MULTIPLE CRITERIA PREFERENCES IN OUTRANKING METHODS

GRECO Salvatore
Faculty of Economics - University of Catania Italy

FIGUEIRA José
University of Coimbra Portugal

Paper in an organized session

Keywords: Decision Theory and Analysis, Multi-Criteria Decision Aids

We introduce the modelling of specific interactions between criteria expressing positive and negative preferences considered as reasons in favor and reasons against the

comprehensive preferences. In order to take into account, specific interactions between criteria in this context, especially the power of the opposing criteria, multiple criteria positive and negative preferences are aggregated using the bipolar Choquet integral. The bi-polar approach is applied to the two most well-known classes of outranking methods: ELECTRE and PROMETHEE.

Paper-ID: 966

Nondominated solutions for Multiple objective shortest path problem

ABBAS Moncef
USTHB, Faculté de mathématiques Algeria

Contributed paper

Keywords: Mathematical Programming, Multi-Criteria Decision Aids, Routing

The shortest path problem is quoted as the most common problem in operations research. The problem is generally multidimensional in nature, and in many situations the explicit consideration of multiple objectives is adequate. Objectives related to cost, distance, time, environmental impact are appropriated for selecting the best compromise solution. Our contribution is focused on two problems of the shortest path in the context of multiple objective approach. The first problem consist to obtain a shortest path between two fixed vertices and the second is more general. We establish some results, in particular, the characterization of the existence of non dominated solutions.

Paper-ID: 1594

On Bipolar Sugeno integral as a bipolar aggregation function

GRECO Salvatore
Italy

GRABISCH Michel
Universite Paris I - Pantheon-Sorbonne France

LABREUCHE Christophe
Thales Research Technology France

SLOWINSKI Roman
Poznan University of Technology Poland

Paper in an organized session

Keywords: Decision Theory and Analysis, Fuzzy Sets and Systems, Multi-Criteria Decision Aids

We present the bipolar Sugeno integral. It can be be viewed as a very general ordinal aggregation function taking into account bipolarity of the scales to be aggregated. We propose also a characterization of the Bipolar Sugeno integral. We study also some of its particular cases (bipolar maximum, bipolar minimum, bipolar weighted maximum and bipolar weighted minimum, bipolar ordered weighted maximum and minimum, bipolar partial maximum and minimum, bipolar order statistics).

WC05, 14:00 – 15:30 **Salon des Roses B**
Group Decision Making and Auctions II (C06b)

Chair: BJORNDAL Mette

Paper-ID: 1398
Allocation of Resources in the Presence of Indivisibilities: Scarf's Problem Revisited

BJORNDAL Mette
JORNSTEN Kurt
Norwegian School of Economics and Business Administration, NHH Norway

Contributed paper

Keywords: Auctions / Competitive Bidding, Economic Modeling, Energy Policy and Planning

A major problem presented to economic theory by the presence of indivisibilities is the impossibility of detecting optimality at the level of the firm, or the economy as a whole, based on competitive linear prices. Scarf instead introduces a quantity test, however, this is not a fully acceptable replacement of prices to analyse markets with indivisibilities. Recently, O`Neill et al. have suggested a scheme that generates discriminatory equilibrium prices in markets with non-convexities. In this paper we elaborate this idea even further to generate non-linear price functions, that can be interpreted as a non-linear pricing scheme for markets with non-convexities.

Paper-ID: 433
A relationship between weights and power in voting games

MALLOR Fermin
FRANCO M. Angeles
GOMEZ Sagrario
Public University of Navarre Spain

Contributed paper

Keywords: Game Theory, Reliability, Stochastic Models

This work aims to reach an explicit relationship between weights and Shapley power indices in voting games. By using a random model, we obtain a formula that allows us to express the weight of a player in a voting game in terms of a combination of his Shapley power indices in a set of "very close" voting games. We point out that this result has a theoretical interest because no similar results, that is, explicit equations involving both weights and Shapley values, are known. We also show the application of this result in a reliability context.

Paper-ID: 1399
An Operational Criterion for Group Probability

RAVID Itzhak
Israel

Contributed paper

Keywords: Bayesian Statistics, Decision Theory and Analysis, Group Decision Making and Negotiation

"Probability scores", like the quadratic or the logarithmic, are known operational criteria for an individual probability. They are supposed to encourage both one's effort to get more information upon which to base his assessment, and his honesty (revealing his true assessment). Scholars put doubts on the possibility of a similar rewarding scheme that would encourage a group of experts to share all members' information and cooperate honestly to come up with a "group probability". However, I propose a simple scoring scheme that complies with both requirements.

WC06, 14:00 – 15:30 — Nafsica A
Production & Inventory Systems III (C69)

Chair: VAN DEN HEUVEL Wilco

Paper-ID:590

A polynomial time algorithm for a deterministic joint pricing and inventory model

VAN DEN HEUVEL Wilco
WAGELMANS Albert
Erasmus University Rotterdam Netherlands

Contributed paper

Keywords: Production and Inventory Systems, Scheduling

We consider the uncapacitated economic lot-size model, where demand is a deterministic function of price. In the model a single price need to be set for all periods. The objective is to find an optimal price and ordering decisions simultaneously. Kunreuther and Schrage (1973) proposed an heuristic algorithm to solve this problem. Our contribution is twofold. First, we derive an exact algorithm to determine the optimal decisions. Second, we show that our algorithm boils down to solving a number of lot-sizing problems that is quadratic in the number of periods, i.e., the problem can be solved in polynomial time.

Paper-ID: 863

LAGRANGIAN HEURISTICS FOR CAPACITATED LOT SIZING PROBLEMS WITH TIME WINDOWS AND SETUP TIMES

BRAHIMI Nadjib
France

DAUZERE-PERES Stephane
Ecole des Mines de Nantes/IRCCyN France

NAJID Najib
UT/IRCCyN-Nantes France

Contributed paper

Keywords: Mathematical Programming, Production and Inventory Systems, Programming, Integer

The classical dynamic lot sizing problem is extended to consider time windows and setup time constraints. Two types of time windows are considered: the general case of customer specific time windows, and the particular realistic case of non customer

specific time windows. We designed and tested different Lagrangian heuristics to solve these problems. Data sets were generated by extending benchmarks from the lot-sizing literature. Satisfactory numerical results are reported.

Paper-ID: 1304

MULTI ITEM SINGLE SOURCE ORDERING WITH TRANSPORTATION COST

ERTOGRAL Kadir
King Fahd University of Petroleum and Minerals Saudi Arabia

Contributed paper

Keywords: Mathematical Programming, Production and Inventory Systems, Supply Chain Management

It has been long recognized in the literature that there can be significant gains in integrating inventory and transportation decisions. The problem dealt with here is a common one in retail sector where several items have to be ordered from a single supplier. We assume that there is a finite planning horizon and deterministic demand for each item in each period. In addition to the inventory holding cost, the retailer incurs a fixed cost associated with each order for each item and a piece wise linear transportation cost. We suggest a Lagrangean decomposition based solution procedure for the problem.

Paper-ID: 501

Alternative Policies by Heuristics for Dynamic Scheduling of a Two-Class Base-Stock Controlled System

KAT Bora
AVBAR Zeynep Müge
Middle East Technical University Turkey

Contributed paper

Keywords: Production and Inventory Systems, Programming, Dynamic, Queuing Systems

Dynamic scheduling of single facility processing items one by one is studied. Inventories of two types of items are managed by base-stock control policies for the case of Poisson demand and exponential processing times. The decision criterion under which structure of the optimal scheduling policy is investigated is a weighted average of the fill rates. Performance of the optimal policy is compared to those of two well-known policies, LQ (Longest Queue) and FCFS (First-Come-First-Served), and alternative polices are generated by heuristic approaches.

WC07, 14:00 – 15:30 — Nefeli B

Project Management and Scheduling III (C74b)

Chair: BALLESTIN Francisco

Paper-ID: 1405

Heuristic algorithms for the stochastic RCPSP

BALLESTIN Francisco
Public University of Navarra Spain

Contributed paper

Keywords: Metaheuristics, Project Management and Scheduling

The Resource Constrained Project Scheduling Project (RCPSP), together with some of its extensions, has been widely studied. However, very little effort has been made in developing heuristics for the RCPSP with stochastic durations, that is, when the duration of activities is given by a distribution of probability. In this paper we discuss when it is worth the effort, in heuristic algorithms, to work with stochastic durations instead of deterministic ones. We develop two algorithms - with new techniques useful for many heuristics for this problem - capable of outperforming the few other existing heuristics of the literature

Paper-ID: 14

A Genetic Algorithm for Resource Investment Problem, Enhanced by Revised Akpan Method

SHADROKH Shahram
KIANFAR Fereydoon
Sharif University of Technology Iran, Islamic Republic Of

Contributed paper

Keywords: Metaheuristics, Project Management and Scheduling, Scheduling

In this paper a genetic algorithm for solving a class of project scheduling problems, called Resource Investment Problem, is presented. Tardiness of project is permitted with defined penalty. Elements of algorithm such as chromosome structure, unfitness function, crossover, mutation, immigration and local search operations are explained. We enhanced the GA using a modified type of Akpan algorithm. The performance of this genetic algorithm is compared with the performance of other published algorithms for Resource Investment Problem

Paper-ID: 395

Scheduling with Petri-Net

MATSUYAMA Keisuke
Japan

Contributed paper

Keywords: Graphs and Networks, Scheduling

When certain OR-problems become subjects of discussion, we often introduce some network diagrams. As such examples we can cite project network diagram and Petri-Net. Project network diagram is used when PERT and CPM are applied.

Petri-Net is applied to show the process in which occurrences of asynchronous events are synchronized. Assume a project network diagram is given. Then we present a procedure, with which project network is transformed into Petri-Net. Moreover we prove some properties of Petri-Net mathematically. As a result, we can describe the dynamism process of scheduling and planning projects.

Paper-ID: 1029

GRASP AND PATH RELINKING FOR PROJECT SCHEDULING UNDER PARTIALLY RENEWABLE RESOURCES

VILLA Ma Fulgencia
FLORIDA UNIVERSITARIA Spain
ALVAREZ-VALDES Ramon
CRESPO Enric
TAMARIT Jose
University of Valencia Spain

Contributed paper

Keywords: Metaheuristics, Project Management and Scheduling

In this paper we develop a greedy randomised adaptive search procedure (GRASP) for project scheduling with partially renewable resources. This new type of resources allow us to model conditions appearing in practice which could not be modelled with the standard renewable and non-renewable resources. We also propose a Path Relinking algorithm which operates on a set of elite solutions obtained by the GRASP procedure, in order to obtain improved schedules. We present the results of an extensive study on several sets of previously reported test problems. The computational results show the efficiency of the proposed algorithms.

WC09, 14:00 – 15:30 **Jupiter (small)**

Financial Modelling III (C34)

Chair: TRAFALIS Theodore

Paper-ID: 1582

KERNEL PRINCIPAL COMPONENT ANALYSIS AND SUPPORT VECTOR MACHINES FOR STOCK PRICE PREDICTION

TRAFALIS Theodore
United States

INCE Huseyin
Gebze Institute of Technology Turkey

Contributed paper

Keywords: Artificial Intelligence, ES and Neural Networks, Financial Engineering, Financial Modelling

Financial time series are complex, non stationary and deterministically chaotic. Technical indicators are used with Principal Component Analysis (PCA) in order to identify the most influential inputs in the context of the forecasting model. Neural networks (NN) and support vector regression (SVR) are used with different inputs. Our assumption is that the future value of a stock price depends on the financial indicators although there is no parametric model to explain this relationship. This relationship comes from the technical analysis. Comparison shows that SVR and MLP networks require different inputs. Besides that the MLP networks outperform the SVR technique.

Paper-ID: 1248

A long term international engineering financial model:A validation through a case study

CHEVALIER Alain
JYOTI Gupta
ESCP-EAP France

Contributed paper

Keywords: Financial Engineering, Financial Modelling, International Business

In this paper, the authors develop a long term model which integrates financial engineering goals and constraints of international groups and validate this model developing a case study. Over nearly 40 years the industrial group studied here has grown principally through acquisitions. The financial managers of the group used all over this period very different financial tools,issues,structures and means of payment. In a majority of circumstances,strategy put constraint on the most important financial decisions. In some specific cases financial constraints were so strong that financial policies were dominating the global strategy. In conclusion a typology is presented and discussed.

Paper-ID: 1308

Robust Portfolio Shortfall Minimization

PACHAMANOVA Dessislava
LOMBARDI Ricardo
Babson College United States

Contributed paper

Keywords: Financial Modelling, Robust Optimization

Real-world data are rarely accurate, yet portfolio allocation decisions are frequently made based on the solutions of optimization algorithms that treat estimated parameters in the models as given. We propose a robust optimization formulation of the problem of portfolio shortfall minimization. We study the performance of the robust approach in computational experiments with simulated and real market data.

WC10, 14:00 – 15:30 — Nefeli A

Web based information systems (C27)

Chair: MIKHALEVICH Mikhail

Paper-ID: 238

E-learning in Post-Soviet Countries:Problems, Questions and Challenges

MIKHALEVICH Mikhail
Ukrainian Academy of Foreign Trade
KOSHLAI Ludmilla
Institute of Cybernetics

Contributed paper

Keywords: Decision Support Systems, Education and Distance Learning, Web-based information systems

E-learning is an important problem for education in NIS where a lot of specialists try to change their speciality and to obtain economic knowledge.The application of information and communication technologies faced the weakness of telecommunications, insufficient number of private computers, non regular employment. Several approaches to E-learning, including elaboration of case-study, educational portals, didactic possibilities of multimedia will be discussed. Special attention will be paid to application of simulation modelling and DSS to E-learning processes. A brief overview of the state of the art in the economic education will be done and future research directions will be proposed.

Paper-ID: 102

An Evaluation of Online Relationship Marketing Effectiveness in Greek Banking Sector

IOANNIDIS ODYSSEAS
NATIONAL BANK OF GREECE Greece

VLACHOPOULOU MARIA
MANTHOU VASSILIKI
UNIVERSITY OF MACEDONIA Greece

Contributed paper

Keywords: Finance and Banking, Marketing, Web-based information systems

In the constantly changing competitive landscape of European banking, financial institutes try to define and adopt the most innovative marketing strategies, in a customer relationship direction, and champion their Internet presence as a fundamental element of their core banking activities. This paper examines how effectively Greek banks use Internet relationship marketing to achieve their business goals. All Greek banks are studied in terms of their web sites attributes, facilities, functionality and operations, using a proposed assessment model. The model is derived from the relationship marketing strategy objectives and the corresponding tactics tailored to online banking environment.

Paper-ID: 1135

E- learning for enhancement of afforestation in rural areas and perspective of Pella

SOUTSAS Konstantinos
Technological Educational Institute of Larisa

ANDREOPOULOU Zacharoula
Aristotle Univ. of Thessaloniki Greece

ARABATZIS Garyfallos
Democritus University of Thrace Greece

Contributed paper

Keywords: Education and Distance Learning, Environmental Management

This paper researches the perspectives on the application of e- learning activities in the remote prefecture of Pella for farmers and non- farmers who participate in afforestation projects. Within the reform of Common Agriculture Policy in European Union in 1992, as described in Regulation EE 2080/92 and recently in Regulation EE 1257/99 in article 31, refunds created the possibilities to withdraw agricultures and accelerate the application

of programs concerning afforestation of agriculture lands. E- learning can be an effective tool for the enhancement of afforestation and consequently for rural development.

Paper-ID: 1185

Supporting the development of small-scale aquaculture units for freshwater ornamental fishes using distance learning in a web environment.

ANDREOPOULOU Zacharoula
KOKKINAKIS Antonis
BOUCHOUNAS Triantafyllos
Aristotle University of Thessaloniki Greece

Contributed paper

Keywords: Education and Distance Learning, Multimedia, Web-based information systems

Worldwide, aquaculture is a rapidly expanding industry mainly for nutritional purposes. The development of small-scale fish farms for fresh water ornamental fishes using new technologies of rearing can be a secondary occupation for populations in remote areas allowing a supplementary income. This paper describes the diffusion of information about the cultivation of the most important commercially fresh water ornamental fish species, using distance-learning features in a web environment. The asynchronous multimedia application will help the involved persons to be properly trained in contemporary aquaculture methods using environmental friendly, simple and inexpensive technology.

WC11, 14:00 – 15:30 — Executive Room Alpha
Analytical Hierarchy Process II (C04)

Chair: MORENO-JIMENEZ José Maria

Paper-ID: 903

DECISIONAL TOOLS FOR E-COGNOCRACY

MORENO-JIMENEZ José Maria
Spain

AGUARON Juan
ALTUZARRA Alfredo
ESCOBAR Maria Teresa
Universidad de Zaragoza Spain

Contributed paper

Keywords: Analytic Hierarchy Process, Complex Societal Problems, Group Decision Making and Negotiation

This paper offers an in-depth study of the philosophical and methodological aspects of the new and recently-proposed democratic system: e-cognocracy. More specifically, it presents different decisional tools for the extraction and diffusion of the knowledge relative to the resolution of problems posed in the context of e-governance. The proposed tools are designed in order to favour group decision making with AHP when the actors are spatially distributed, considering two different scenarios, namely close

opinions and opposing views, as well as two of the most widely used priorisation methods used in AHP (row geometric mean and the eigenvector methods).

Paper-ID: 441

Using AHP method to Determine Effective Criteria for Production Manager Selection in Furniture Industries, The Case of Study: Iran

AZIZI Majid
Tehran University

Contributed paper

Keywords: Analytic Hierarchy Process, Group Decision Making and Negotiation, Management Information Systems

Determination of effective criteria in decision making to select for production manager in furniture industries is main activity in increase of units efficiency. For know how of effective criteria in manager selection 9 units were searched in Tehran province. These criteria were divided into five major groups and 10 subsections. An hierarchy was constructed based on five major groups of criteria. The weight of the indicators were then established by Analytical Hierarchy Process. The result showed that Overall Inconsistency index is 0.01 and among 12 criteria in manager selection for furniture industry, 5 of them had the highest priorities.

Paper-ID: 1264

Priority derivation in AHP with interval judgments

DESPOTIS Dimitris
University of Piraeus Greece

Contributed paper

Keywords: Analytic Hierarchy Process, Multi-Criteria Decision Aids

This paper presents a minmax goal programming approach to priority estimation in the analytic hierarchy process (AHP) with approximate pair-wise comparisons, provided as interval numbers. The new approach is compared with other established methods and is illustrated by a numerical example.

WC12, 14:00 – 15:30 — Executive Room Beta
Continuous optimization III (O26)

Chair: GOBERNA Miguel

Paper-ID: 1307

On discretization methods in semi-infinite programming

STILL Georg
University of Twente

Paper in an organized session

Keywords: Programming, Nonlinear, EWG EUROPT Continuous Optimization Working Group

We deal with discretization methods for solving semi-infinite problems. Firstly, the question of the existence and unicity of a (local) solution of the discretized problem near a local solution of the SIP-problem is discussed. Then we de deal with the rate of convergence. We review known results (e.g. for linear SIP-problems) and give new ones.

Paper-ID: 1168

Generalized Semi-Infinite Optimization and Anticipatory Systems

WEBER Gerhard-Wilhelm
KARASOZEN Bulent
TEZEL Aysun
Middle East Technical University Turkey

Paper in an organized session

Keywords: Bioinformatics, Mathematical Programming, EWG EUROPT Continuous Optimization Working Group

Generalized semi-infinite optimization problems admit an infinite set of inequality constraints which depends on the state. Under suitable assumptions on lower and upper stage, we present continuity and stability properties of the entire problem. By studying three applications, we interpret perturbational and inverse aspects in the sense of anticipation: (i) Reverse Chebychev approximation, where we want to approximate a system under some error tolerance as long as possible. (ii) Time-optimal problems, where we want to pull or push the time-horizon of some process. (iii) Computational biology, where we are concerned with prediction and stability of DNA microarray gene-expression patterns.

Paper-ID: 322

Numerical treatment of a class of Volterra equations of the first kind

GUSTAFSON Sven-Ake
Norway

Paper in an organized session

Keywords: Energy Policy and Planning, Mathematical Programming, EWG EUROPT Continuous Optimization Working Group

We present a method for solving ill-posed linear integral equations of the first kind, where the right hand side consists of a sparse set of measured values. We regularise the problem by requiring that the calculated solution satisfies certain convexity conditions. This leads to a semi-infinite program. Numerical examples are presented, illustrating the calculated values of the solution curve are well determined, even if one needs to solve a sequence of linear systems of equations with large condition numbers.

WC13, 14:00 – 15:30 — Executive Room Gamma
Traffic Issues (C46)

Chair: PROFILLIDIS Vassilios

Paper-ID: 58

Recent changes in Technology and Electronics and Impact on the Management of the Railway Undertaking

PROFILLIDIS Vassilios
Democrutis University of Thrace Greece

BOTZORIS George
Greece

Contributed paper

Keywords: Transportation and Logistics

The present paper focuses on operation, finances and efficiency of railways. A survey of application of advances of technology and electronics in railways is attempted. The impact of these innovations in daily operational issues is discussed. The new management schemes of railways in order to tackle the new challenges are extensively analyzed. Impact of these schemes in the improvement of finances, realization of changes, increase of quality of services and customer satisfaction is studied.

Paper-ID: 449

Optimizing Routes in the Delivery of Frozen Products using the DSS LOGDIS

FAULIN Javier
Public University of Navarra Spain

SAROBE Pablo
SIMAL Jorge
TECNICIA Corporation Spain

Contributed paper

Keywords: Decision Support Systems, Routing, Transportation and Logistics

We have designed a DSS for the routing optimization in the frozen products delivery at FRILAC Company (Navarra, Northern Spain). The logistic department of FRILAC managed the daily planning of the delivery process organizing the vehicles tours, but this process was deemed inaccurate and expensive. We suggested creating a DSS which makes this procedure easier reaching a twofold goal: the design of a route-builder considering the current road network of the area and the integration of that DSS into the global management of the company. Both objectives were achieved by the construction of the DSS LOGDIS in Microsoft Access.

Paper-ID: 711

On the Effect of High-Speed Orbital-Radial Transit System on Travel Time

SUZUKI Tsutomu
University of Tsukuba Japan

FUJITA Satohiro
Toyama Prefectural Government Japan

Contributed paper

Keywords: Transportation and Logistics

Travel time in a city is significantly influenced by high-speed transit system such as metro, light rail, or guideway bus services. In this paper we treat route catchments, optimal locations of orbital-radial transit system, and its effect on travel time and modal choice within a circular city. We consider two types of system: one is n-ring/radial routing system with an infinite number of radial roads and a finite number of orbital roads, and the other is m-radial/n-ring high-speed routing system with a finite number of radial-orbital high-speed roads and an infinite number of low-speed orbital roads.

Paper-ID: 1078

Base Station Location and Channel Allocation in Cellular Networks with Movable Demand

BATTA Rajan
TOKAR ERDEMIR Elif
DELMELLE Eric
ROGERSON Peter
University at Buffalo (SUNY) United States

Contributed paper

Keywords: Location, OR for Electronic Services

Many cell phone calls are made while in motion, especially on roads. The locations of base stations (BS) have to be chosen that there is enough coverage for both movable and stationary demand. In this study, a mixed integer programming (MIP) model is proposed which integrates the base station location, the frequency channel assignment and the quadratic demand path coverage problems. Some properties of the model are highlighted that give insight to the problem structure. For the solution, Lagrangean based heuristics are developed using subgradient optimization and branch-and-bound techniques that are run on different instances of the problem.

WC14, 14:00 – 15:30 — Executive Room Delta
Maintenance and Stochastic Models (C77)

Chair: PANAGIOTIDOU Sofia

Paper-ID: 603

Optimal preventive maintenance policies for equipment with multiple operating states

PANAGIOTIDOU Sofia
TAGARAS George
Aristoteles University of Thessaloniki Greece

Contributed paper

Keywords: Quality Management, Reliability

We develop a mathematical model for the analysis of maintenance policies for a production process that may operate in one of two different quality states and is also subject to failure. The process starts its operation in the good quality state but it may shift to the inferior quality state after a random time, before failure or scheduled preventive maintenance. The two quality states are characterized by different failure rates and costs. We study the effect of the process quality shift on the optimal time of age-based preventive maintenance for various policies under alternative problem settings and model assumptions.

Paper-ID: 933

On the Energy Contract Portfolio Problem

ORTUNO M. Teresa
Universidad Complutense de Madrid Spain

ALONSO AYUSO Antonio
Universidad Rey Juan Carlos Spain

CRISTOBAL Pilar
Universidad Politécnica de Madrid Spain

ESCUDERO Laureano Fernando
Universidad Miguel Hernandez Spain

PIZARRO Celeste
Universidad Rey Juan Carlos Spain

Contributed paper

Keywords: Stochastic Models

Given a power generation system and a set of energy trading contracts, the ECPP is concerned with selecting the bilateral contracts for energy purchasing and selling to be delivered along a given time horizon. A multi-stage full recourse model is presented for price-taker operators. The main uncertain parameters are spot price, water exogenous inflow and fuel/gas cost and availability. The weighted Reaching Probability is considered as a risk measure to optimize, combined with the maximization of the expected bilateral and spot market trading profit. A problem solving approach based on a splitting variable mathematical representation via scenarios is considered.

Paper ID: 1688

Product Portfolio Management: A Mean-Variance Approach

ARAMAN Victor
Stern School of Business, New York University

FRIDGEIRSDOTTIR Kristin
Decision Sciences, London Business School

Contributed paper

Keywords: Queuing Systems, Stochastic Models, Supply Chain Management

We present a new product portfolio model, which captures interactions between projects through competition for scarce resources. We analyze the optimal portfolio through a queueing based model while taking a mean-variance approach. We compare this operational model to its financial analogue portfolio model.

WC15, 14:00 – 15:30 **VIP Lounge**
OR and the internet (C64)

Chair: MITRA Gautam

Paper-ID: 1553
Web: Enabled Optimsation: OSP to WEBOPT

MITRA Gautam
VALENTE Patrick
Brunel University United Kingdom

POOJARI Chandra
CARISMA United Kingdom

Contributed paper

Keywords: Decision Support Systems, OR and the Internet, Web-based information systems

The optimization service provider project (OSP) is a recently concluded project for the delivery of optimization tools and applications across the web. In a follow up project 'WEBOPT' distributed components for creating web based DSS applications are under development. We discuss the context ('why') of these developments as well as 'what' is planned and 'how' we set out to achieve these.

Paper-ID: 439
An Interactive Portfolio Program using Optimization and Simulation

ROMERO Absalon
Mexico

Contributed paper

Keywords: Financial Modelling, OR and the Internet

An interactive program was designed to find desirable portfolios when several investments are available. It is used the Yahoo Finance Web site that contain historical monthly stock price data for most companies during any time period. The program uses Markowitz Model, Bootstrapping and Log Normal Model. All of this is done in "real time", so that an active Web connection is required. The tools used were Excel, Solver, @Risk, VBA code and Yahoo Finance site.

Paper-ID: 1034
An Evaluation of organization's web pages effectiveness in Hellenic industry. The case of the top 200 organizations.

DROSOS DIMITRIOS
GRADUATE TECHNOLOGICAL EDUCATION INSTITUTE OF PIRAEUS Greece

Contributed paper

Keywords: Decision Support Systems, OR and the Internet, OR for Electronic Services

Information Technologies influence the strategic management and marketing of contemporary organizations as a paradigm - shift is experienced transforming the best business practices globally. IT is one of the main key influences off competitiveness in the

global industry. The development of new technology directly affects price and thus competition through achieving cost savings. This document presents the evaluation of the top 200 organization's web pages effectiveness in the Hellenic industry. As follows, a model of the use of multi-criteria is applied which based on the methods of Linear Programming.

Paper-ID: 1283

INTERNET BANKING AND THE ROLE OF MANAGEMENT IN THE NEW ECONOMY

MIZITHRA Maria
National Bank of Greece Greece

TRAKHANAS Konstantinos
Air Force Academy Greece

Contributed paper

Keywords: Finance and Banking, OR and the Internet, Strategic Planning and Management

Internet Banking users have formed a significant segment of the Banking Industry clientele, increasing every year. Internet Banking services providers among the traditional Banks are also becoming more every year. Taking under consideration that new technology, high investments, hard to please customers, expanding market places and of course a continuously changing and utmost competitive environment are issues to be faced at the same time and probably by the same person, we are looking at the new and demanding role of management and O.R., describing the current situation in the Greek Banking Sector.

WC18, 14:00 – 15:30 **Jupiter Lobby**
Discussion Presentations VIII

Paper-ID: 895, WC18, 14:00-14:30, Panel #25

Hybrid GA + multicriteria automated diagnosis

GOLETSIS Yorgos
PAPALOUKAS Costas
KATSIS Christos
FOTIADIS Dimitrios
University of Ioannina Greece

Discussion presentation paper

Keywords: Decision Support Systems, Medical Applications, Multi-Criteria Decision Aids

Automated diagnosis can often be considered as a classification problem. We, hereby, present a hybrid technique for classification comprising of a multicriteria method and a genetic algorithm. The multicriteria classification method assigns objects to predefined categories (nominal sorting) under selected criteria. The method's parameters are calculated automatically with the implementation of a genetic algorithm. Our technique was tested in two medical applications: (i) cardiac beat classification (referring to myocardial is chaemia) and (ii) automated diagnosis of electromyography motor action unit potentials (MUAPs) (referring to neuropathies and myopathies). In both cases, our technique performed equally or even better than other similar approaches.

Paper-ID: 557, WC18, 14:00-14:30, Panel #32

OPERATIONS RESEARCH APPLICATIONS IN ELECTRONIC COMMERCE: A LITERATUR REVIEW

CEYHAN Mehmet
MERIC Asiyan
Istanbul Technical University Turkey

Discussion presentation paper

Keywords: Auctions / Competitive Bidding, OR and the Internet, Supply Chain Management

Wide spreaded usage of Internet in every area of daily life has contributed a strategic importance to electronic commerce. While improving quickly, e-commerce also creates different attractive opportunities for Operations Research (OR).In this study, a survey of OR applications in e-commerce is presented. In which areas of e-commerce OR practitioners are mostly active and how they are benefited by it are the main points of this study. Meanwhile,why OR has a key role in wide-spreadly improving digital economy is another question that is mentioned in this literature review. Finally, in the future the new application areas for OR discipline are also considered.

Paper-ID: 1141, WC18, 14:00-14:30, Panel #39

The Latest Arrival Hub Covering Model: Specifications for Cargo Delivery

TAN Pinar
KARA Bahar Yetis
Bilkent University Turkey

Discussion presentation paper

Keywords: Location, Mathematical Programming

In this research the cargo delivery application of the hub location problem is analyzed. It is observed that there are some deficiencies at the traditional hub location models. The integer programming formulations specific to cargo delivery system are presented and the computational results are compared with the current structure of a cargo delivery firm. Besides, two variations of the original model are developed. The first variation enabled us to select more reasonable locations and in the second variation the structure of the original model is changed in order to improve the quality of the cargo delivery service.

Paper-ID: 1569, WC18, 14:30-15:00, Panel #12

A AHP application in E-COMMERCE

CEYHAN Mehmet
MERIC Asiyan
Istanbul Technical University Turkey

Discussion presentation paper

Keywords: Analytic Hierarchy Process, OR and the Internet

In this study, a policy evaluation and decision-making model is developed for a hypothetical e-commerce web site. The main starting point for this study is to measure the fast and quality shipping distribution policy by using the shortest path algorithm. However, since real world has a multi-objective structure, this study has focused on

multi-criteria decision-making analyzes. The success of such kind of company depends on both customer's and firm's expectations. Both qualitative and quantitative criteria and information should be considered for the best distribution policy. AHP, which combines qualitative and quantitative criteria to obtain a single score is used .

Paper-ID: 1656, WC18, 14:30-15:00, Panel #19

Considering the contemporary, global environment within which the industries ought to operate, is there a chance left that strategic groups may occur?

FEKA Virginia

Discussion presentation paper

Keywords: Strategic Planning and Management

The contemporary, global environment has changed the prospects as well as the structure of the industries. The main features of this global market seem to be the aggravated competition, the reduction in the market protectionism, the exorbitant transportation of funds, and of course the mergers and acquisitions. A question that arises, thus, is: in that very fast changing, often unpredictable, chaotic environment, how safe is it to detect viable strategic groups? Moreover, what should be the characteristics according to which a strategic group will be defined?

Paper-ID: 1153, WC18, 14:30-15:00, Panel #33

A bilevel programming formulation for modeling the location of information points for traffic conditions

MONTERO Lidia
CODINA Esteve
UPC Spain
MARIN Angel
Universidad Politécnica de Madrid Spain

Discussion presentation paper

Keywords: Transportation and Logistics

A key question is to decide which points of the traffic network are critical in order to inform the drivers of their conditions. In this contribution, the type of information given to the drivers is assumed to be an estimation of the travel time at some points. The bilevel formulation assumes that some network index performance is to be optimized whereas the lower level problem is modeled by an stochastic assignment with link cost variance that can be reduced at a set of candidate points. The algorithmic framework proposed is an heuristic method based on the iterative optimization-assignment method.

Paper-ID: 1149, WC18, 14:30-15:00, Panel #40

How can health information technology influence to reduce medical errors?

TAVAKOLI Nahid
University of Medical Sciences Iran, Islamic Republic Of

Discussion presentation paper

Keywords: Health Care, Medical Applications

Malpractice suits against the doctors are becoming frequent nowadays. Major or active medical errors are horrific cases that make headlines. In Iran , legal-medicine organization reported that between 1997-2000 the number of complaint against medical error has been increasing year by year . It is a prime responsibility of the hospital to provide accurate and adequate medical record . The health care management professional is a key player in reducing the omission and illegible entries in the medical record . In most cases electronic medical record can function as an important key in the battle against medical errors.

Paper-ID: 1439, WC18, 15:00-15:30, Panel #13

Analysis of Options Contracts under Stochastic Demand and Asymmetric Information

CINAR Esra
BILGIC Taner
Bogazici University Turkey

Discussion presentation paper

Keywords: Supply Chain Management

Supply Chains are setup with the expectation that risks due to the uncertainty in the customer demand can be reduced. Option contracts can provide trading partners with flexibility to respond to uncertain market conditions by allowing the buyer to purchase options along with a committed quantity. The buyer decides whether or not to exercise these options after demand is realized. We study a two-period model with option contracts in a stochastic demand environment. We search for conditions that lead to channel coordination. We also analyze the asymmetric information case where the buyer has private information on his cost structure.

Paper-ID: 144, WC18, 15:00-15:30, Panel #20

Customers' Perceptions for E-store Services

PATSIOURA Fotini
VLACHOPOULOU MARIA
MANTHOU VASSILIKI
UNIVERSITY OF MACEDONIA Greece

Discussion presentation paper

Keywords: Marketing, Web-based information systems

Successful web retailing is accomplished by making the most of the in-home shopping advantages, so that e-shoppers feel comfortable and confident enough to make an online purchase. It is well written that the enhancement of customer satisfaction of users purchasing on-line is closely related to the quality of the services provided by the web-based shopping environment. This paper presents a review of academic literature on the customers' perceptions for e-store services. The authors propose a framework of features to evaluate the quality of the services provided online during and after the customer's purchasing experience, and practices to support their efficiency.

Paper-ID: 900, WC18, 15:00-15:30, Panel #34

Some Models for the Voltage induced in a liquid by cavitation

MARZA Vasile
Ovidius University Constantza Romania

BARBULESCU Alina
Romania

Discussion presentation paper

Keywords: Mathematical Programming. Programming, Nonlinear

The aim of this paper is to study the existence of the electrical effects induced by the ultrasonic cavitation at the exterior of the cavitation bubbles, in watter and to give a mathematical model for the voltage induced by cavitation .

Paper-ID: 604, WC18, 15:00-15:30, Panel #41

Information system to support decision-making and control in public mass transport area.

KLECAKOVA Jana
KALIKA Marek
Czech Technical University, Faculty of Transportation Sciences Czech Republic

Discussion presentation paper

Keywords: Decision Support Systems, Web-based information systems

Knowledge information processing system to monitor, analyze, predict traffic flows and movement of transport modes. The system is able to supply actual information about the best connection between locations. The heartbeat of the system is a database management system where current information about all subjects of surveillance is stored. On the basis of analyzed data other components are controlled. User location diagnostics and the solution of public mass transport terminal architecture is investigated as well as the GIS system solution in conjunction with the www interface (for decision-making and control including information provision through digital map display).

Paper-ID: 1431, WC18, 15:00-15:30, Panel #6

The Effect of Different Learning Rates on the Performance of Aggregating Algorithm in the Context of Portfolio Selection

LEVINA Tatsiana
Queen's School of Business Canada

SHAFER Glenn
Rutgers University United States

Discussion presentation paper

Keywords: Financial Engineering, Financial Modelling

We introduce a new strategy for selecting portfolios in the stock market, a Gaussian random walk (GRW). This strategy is based on Vladimir Vovk's aggregating algorithm and his work on Markov switching strategies. One of the most important parameters of the aggregating algorithm is the learning rate which determines how fast the method learns from one trading period to another. The learning rate different from one was not studied extensively in the literature, thus we present theoretical and empirical results of applying GRW with different values of the learning rate to portfolio selection problem.

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MD08	Nafsica B	Meta-Heuristics I
MD09	Jupiter (small)	Financial Engineering II
MD10	Nefeli A	Health Care
MD11	Executive Room Alpha	Timetabling II
MD12	Executive Room Beta	Non linear programming I
MD13	Executive Room Gamma	Location
MD14	Executive Room Delta	Stochastic Models II
MD15	VIP Lounge	Telecommunication II
MD16	Syndicate Room A	Forestry Management II
MD18	Jupiter Lobby	Discussion Presentations

Tuesday, July 6 — 9:00 – 10:30

TA02	Delphi Amphitheater	Scheduling: Parallel machines
TA03	Athena	Combinatorial Optimization: Set Partitioning
TA04	Salon des Roses A	Multicriteria Decision Aid: Applications in e-business
TA05	Salon des Roses B	EWG ESIGMA: Value Measurement and Decision Conferencing
TA06	Nafsica A	Supply Chain Management IV
TA07	Nefeli B	Data Envelopment Analysis IV
TA08	Nafsica B	Meta-Heuristics II
TA09	Jupiter (small)	Financial Engineering III
TA10	Nefeli A	OR for electronic services I
TA11	Executive Room Alpha	Airline Applications I
TA12	Executive Room Beta	Global optimization
TA13	Executive Room Gamma	Freight transportation and vehicle routing problems
TA14	Executive Room Delta	Knowledge Engineering and Management
TA15	Jupiter (small)	EURO Doctoral Dissertation Award: finalists
TA18	Jupiter Lobby	Discussion Presentations

Tuesday, July 6 — 11:00 – 12:30

TB03-1	Athena	constrained 0/1 quadratic programming: basic approaches and extensions, A. Caprara
TB03-2	Athena	Multidimensional descent methods for global optimization, A. Rubinov
TB04-1	Salon des Roses A	Optimization Issues in Auctions, Th. Crainic
TB04-2	Salon des Roses A	Emerging Multiple issue e-Auctions, H. & J. Wallenius
TB05-1	Salon des Roses B	Robustness in decision-making, Ph. Vincke
TB05-2	Salon des Roses B	Robust Optimization: A Tractable Theory of Stochastic Optimization, D. Bertsimas

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Tuesday, July 6 — 14:00 – 15:30

TC02	Delphi Amphitheater	Scheduling: Multiple objectives and uncertainty
TC03	Athena	Combinatorial Optimization
TC04	Salon des Roses A	EWG MCAD: Multi-Criteria Aid for Decision
TC05	Salon des Roses B	Decision Theory and Analysis
TC06	Nafsica A	Supply Chain Management V
TC08	Nafsica B	Meta-Heuristics III
TC10	Nefeli A	OR for electronic services II
TC11	Executive Room Alpha	Airline Applications II
TC12	Executive Room Beta	Non linear programming II
TC13	Executive Room Gamma	Routing
TC14	Executive Room Delta	Quality Management
TC15	VIP Lounge	Network Design and Optimization
TC18	Jupiter Lobby	Discussion Presentations

Tuesday, July 6 — 16:00 – 17:30

TD02	Delphi Amphitheater	Scheduling: Batch and groups
TD04	Salon des Roses A	EWG MCAD: MCAD and Artificial Intelligence I
TD05	Salon des Roses B	Decision Support Systems
TD06	Nafsica A	Production & Inventory Systems I
TD07	Nefeli B	Project Management and Scheduling I
TD08	Nafsica B	Integer programming
TD09	Jupiter (small)	Financial Modelling I
TD10	Nefeli A	OR for electronic services III
TD11	Executive Room Alpha	Logistics
TD12	Executive Room Beta	Continuous optimization I
TD13	Executive Room Gamma	Human Resource Management
TD15	VIP Lounge	Economic Modelling
TD18	Jupiter Lobby	Discussion Presentations

Wednesday, July 7 — 9:00 – 10:30

WA02	Delphi Amphitheater	Capacity Planning
WA03	Athena	Graphs and Networks I
WA04	Salon des Roses A	EWG MCAD: MCAD and Artificial Intelligence II
WA05	Salon des Roses B	Group Decision Making and Auctions I
WA06	Nafsica A	Production & Inventory Systems II
WA07	Nefeli B	Project Management and Scheduling II
WA08	Nafsica B	Marketing
WA09	Jupiter (small)	Financial Modelling II
WA10	Nefeli A	Management Information Systems and e-Marketing
WA11	Executive Room Alpha	Analytical Hierarchy Process I
WA12	Executive Room Beta	Continuous optimization II
WA13	Executive Room Gamma	Urban traffic
WA14	Executive Room Delta	Reliability and Risk Analysis

WA15	VIP Lounge	Data Mining
WA18	Jupiter Lobby	Discussion Presentations

Wednesday, July 7 **11:00 – 12:30**

WB01	Jupiter	Management Science Strategic Innovation Prize
WB02	Delphi Amphitheater	City Logistics, J. Barcelo (11:45 12:30)
WB03-1	Athena	Polynomial Approximation for NP-hard Optimization Problems, V. Paschos
WB03-2	Athena	Constraint Programming in Scheduling, E. Pesch
WB04-1	Salon des Roses A	Grid-Resource Management – Multi-objective Issues, J. Weglarz & J. Nabrzyski
WB04-2	Salon des Roses A	Optimization Issues in e-Commerce, P. Pardalos
WB05-1	Salon des Roses B	Operations Research and Data Mining, S. Olafsson
WB05-2	Salon des Roses B	Recent Advances on Computational Classification Methods, C. Zopounidis & M. Doumpos

Wed, July 7 **14:00 – 15:30**

WC02	Delphi Amphitheater	Software for OR/MS Analysis
WC03	Athena	Graphs and Networks II
WC04	Salon des Roses A	EWG MCAD: Multi-Criteria Decision Aid Theory
WC05	Salon des Roses B	Group Decision Making and Auctions II
WC06	Nafsica A	Production & Inventory Systems III
WC07	Nefeli B	Project Management and Scheduling III
WC09	Jupiter (small)	Financial Modelling III
WC10	Nefeli A	Web based information systems
WC11	Executive Room Alpha	Analytical Hierarchy Process II
WC12	Executive Room Beta	Continuous optimization III
WC13	Executive Room Gamma	Traffic Issues
WC14	Executive Room Delta	Maintenance and Stochastic Models
WC15	VIP Lounge	OR and the internet
WC18	Jupiter Lobby	Discussion Presentations

Wednesday, July 7 **16:00 - 17:30**

WD01	Jupiter	Closing session

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