EURO SUMMER INSTITUTE

Stochastic and Heuristic Methods in Optimization

Neringa, Lithuania, 25 July – 7 August, 2003

FINAL REPORT

Summary

This is the final report of the XXI EURO Summer Institute which took place in Nida-Neringa, Lithuania, from 25 July to 7 August, 2003, on the subject "Stochastic and Heuristic Methods in Optimization". The XXI ESI has been sponsored by the Lithuanian Operational Research Society (LitORS) and EURO with the active support of EURO itself, FP5 Programme of European Union, Vilnius Gediminas Technical University (VGTU), Institute of Mathematics and Informatics (MII, Vilnius), Lithuanian State Foundation on Study and Research (LSFSR).

The subject has been identified as an emerging issue for a rapidly developing field of modern optimization theory and its techniques. From the call for papers we quote: "*Planning and optimization under uncertainty were begun to consider in the middle of the last century, however the existing experience left more questions than offers ready methods and ways for practical solution. The later challenge stimulates a study of existing techniques as well as development of new, heuristic concepts for optimization. The organization at 2003 of the ESI XXI, aimed to overview last achievements and to gain a common attitude on heuristic and stochastic optimization techniques, is opportune and facilitates to seek the modern level in the field.*
We encourage those interested in the following topics to overview trends and gain a common attitude towards:
- *new trends in stochastic linear and nonlinear optimization;*
- *neural networks for optimal decisions;*
- *evolutionary and genetic algorithms;*
- *optimization by the annealing method and taboo search;*
- *scatter search;*
- *quantum computations and optimization;*
- *aspects of multimode and multiobjective optimization*".

XXI ESI is the first EURO Summer Institute organised in the country of the former Soviet Union as well as in Central and East Europe, thus very facilitating for extension of the area of EURO activity area, stimulating contacts among specialists from many countries in the expanding European research space, and including them to consideration of issues, important to OR.

This report is organised in the following sessions:
- organisation;
- before the ESI;
- the ESI itself;
- feedback and conclusion.

A finance report can be found in Annex A, and pictures of the ESI – in Annex B..

Organisation

The ESI has been governed by two structures: the Organising Committee in the charge of the logistics and the running of the ESI, and Scientific Programme Committee aimed to help in controlling the submissions (when necessary) and in providing the tutorials during the ESI itself.

The two bodies were:

Organising Committee:

- Arkady Borisov, Riga Technical University (Latvia).
- Algis Chiochialis, Vilnius Gediminas Technical University (Lithuania);
- Kestas Ducinskas, Klaipeda University (Lithuania);
- Gintautas Dzemyda, Institute of Mathematics and Informatics (Lithuania);
- Henrikas Pranevichius, Kaunas University of Technology (Lithuania)
- Leonidas Sakalauskas, Institute of Mathematics and Informatics (Lithuania)
- Edmundas Zavadskas, Vilnius Gediminas Technical University (Vilnius, Lithuania)
- Antanas Zhilinskas, Institute of Mathematics and Informatics (Lithuania);

Scientific Programme Committee:

- Anatoly M.Gupal, Institute of Cybernetics (Kiev, Ukraine);
- Jakob Krarup, DIKU University of Copenhagen (Denmark), DORS
- **Oleg Larichev**, Institute of System Analysis (Russia);
- Silvano Martello, University of Bologna (Italy, ECCO);
- Jonas Mockus, Institute of Mathematics and Informatics (Vilnius, Lithuania)
- Boris T.Polyak, Institute of Control Problems (Moscow, Russia);
- Rueven Rubinstein, University of Haifa (Haifa, Israel).
- Marc Sevaux, University of Valenciennes,Valenciennes, France
- **Viacheslav Tanaev**, Institute of Engineering Cybernetics (Minsk, Belarus);
- Tamash Terlaky, MacMaster University (Hamilton, Canada), EUROPT);
- Alexis Tsoukias, LAMSADE, University of Paris-Dauphine (France, EWG on MCAD).

The chairman of the Scientific Programme Committee was Jonas Mockus and the Vice-Chairman – Jakob Krarup, the chairman of the Organizing Committee was Leonidas Sakalauskas.

Before the ESI

The Project of this ESI was intensively developed together with several EURO Working Groups: ECCO (European Chapter on Combinatorial Optimization), MCAD (Multicriteria Aid for Decisions), EUROPT (EURO Continuous Optimization group) and EU/ME (European Chapter on Metaheuristics), that also took part in organisation of the ESI after approval of the project. The application to organise the ESI in 2002 was introduced at EURO in November of 2000 and EURO postponed it to 2003.
The advertising of the Institute has been done since April of 2002 by the EURO Bulletin 10(4). The Institute was registered in the Calendar of the Association of European Operational Research Societies (http://www.euro-online.org), and in other registers of events. The own web-site of the Institute was opened in May of 2003 (http://www.science.mii.lt/LitORS/ESI-XXI). The first call for papers has been diffused in early autumn of 2002, mainly to EURO societies and to sponsoring EURO Working Groups, but also to a number of mailing lists, where interested people could get aware of the initiative. A second mailing has been done in March 2003 in order to recall to the EURO societies and the interested people about the ESI.
By the end of February, 18 regular submissions reached us within the schedule asked in the call for papers. By the end of April we have received the proposal for 1 candidate from IFORS, who was selected by Programme Committee for the ESI (Thiago Fereira de Noronho). In delay we received the demand of one French participant, Anthony de Caumond, asking to participate although not having submitted a paper. He was able to present an original paper that perfectly fit to the ESI subject, and the Programme Committee decided to admit him to the ESI, because ROADEF confirmed his candidature later, too.
The final Programme has been diffused at the beginning of July as soon as exact schedule of the tutorials was fixed. The total number of participants was 20 and, number of invited lecturers was 10, thus total number of young and signor participants is 30. Participants were selected from 18 different countries: Austria, Belgium, Brazil, Byelorussia, Canada, Denmark, Estonia, Finland, France, Israel, Italy, Germany, Lithuania, Poland, Portugal, Russia, Spain, Turkey.

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The ESI itself:

In order to give for participants a chance to promote their research skills and also to explore a country new for them, the ESI was organised in the Nida-Neringa, being one of the most beautiful spas in Lithuania, situated on the shore of Curonian Lagoon. Most of participants (18) arrived to Vilnius and were transferred to NIda-Neringa by two mini-buses offered by VGTU.
The ESI took place within the Hotel and Conference Centre “Urbo Kalnas”, Taikos st 32, Nida-Neringa, fully equipped for such scientific events. Accommodation, sessions and feeding of participants were organised in the same place stimulating for creation of friendly relations and good feelings among participants.

The final programme was at follows:

FRIDAY, July 25, 2003:

14:00 – 20:00: Registration

20:00 – 21:00: Cheese party in the Restaurant "Urbo Kalnas", Neringa

SATURDAY, July 26, 2003

8:00 – 9:30: Breakfast
9:30 – 10:00: Opening of XXI EURO Summer Institute
10:00 – 12:30: Towards practical stochastic and heuristic optimization
Prof. Leonidas Sakalauskas, Institute of Mathematics and Informatics
12:30 – 13:30: Lunch
13:30 – 19:00: Social activity
19:00 – 20:00: Dinner

SUNDAY, July 27, 2003

8:00 – 9:30: Breakfast
10:00 – 13:00: Excursion by bus via Neringa sights
13:00 – 14:00: Lunch
13:30 – 19:00: Social activity
19:00 – 20:00: Dinner

MONDAY, July 28, 2003

8:00 – 9:30: Breakfast
9:30 – 12:30: The Variable Neighborhood Search Metaheuristic– What it Does and Why it Works
Prof. Pierre Hansen, University of Montreal
12:30 – 13:30: Lunch
14:00 – 14:45: Finding a Compromise Solution for a Multiobjective Scheduling Problems
Anne Setamaa, University of Jyvaskyla
14:45 – 15:15 Coffee – Break
15:15 – 16:00: Heuristic Algorithm and Scatter Search for the Cardinality Constrained P//Cmax Problem
Manuel Iori, University of Bologna
19:00 – 20:00: Dinner

TUESDAY, July 29, 2003

8:00 – 9:30: Breakfast
9:30 – 12:30 Software reuse in the field of metaheuristics: Goals, Challenges & Prospects
Prof. Stefan Voss, University of Braunshweig
12:30 – 13:30: Lunch
14:00 – 14:45: A Heuristic Approach for Combined Equipment–Planning and Routing in Multilayer SDH/WDM Networks
Holger Holler, University of Braunschweig
14:45 – 15:15 Coffee – Break

15:15 – 16:00 Pareto Ant Colony Optimization in Multiobjective Portfolio Selection with LP Preprocessing
Dr. Karl Dorner, University of Viena
19:00 – 20:00: Dinner

WEDNESDAY, July 30, 2003

8:00 – 9:30: Breakfast
9:30 – 12:30: Universal properties of the single-layer perceptron
Prof. Sharunas Raudys, Institute of Mathematics and Informatics
12:30 – 13:30: Lunch
14:00 – 14:45: A data–driven model identification method to obtain interpretable Mamdani–Assilian models: preliminary research
Ester van Broekhoven, University of Ghent
14:45 – 15:15 Coffee – Break
15:15 – 16:00: Minimization of projection errors in Sammon's mapping applied in combination with SOM
Olga Kurasova, Institute of Mathematics and Informatics
19:00 – 20:00: Dinner

THURSDAY, July 31, 2003

8:00 – 9:30: Breakfast
9:30 – 12:30: Semi on–line algorithms for partitioning and packing problems
Prof. Vladimir Kotov, University of Belarus
12:30 – 13:30: Lunch
14:00 – 14:45: Neuro–Dynamic Trading Methods
Patricia Casqueiro, University of Lisbon
14:45 – 15:15 Coffee – Break
15:15 – 16:00: Using Simulated Annealing to Optimize the Feature Selection Problem in Predictive Modeling
Ronen Meiri, Tel – Aviv University
19:00 – 20:00: Dinner

FRIDAY, August 1, 2003

8:00 – 9:30: Breakfast
9:30 – 12:30: Approximation algorithms for applied problems in banking and scheduling
Prof. Yakov Shafransky, Institute of Technical Cybernetics, Belarus
12:30 – 13:30: Lunch
14:00 – 14:45: Order Statistics for testing optimality in stochastic optimization
Vaida Bartkute, Institute of Mathematics and Informatics, Vilnius
14:45 – 15:15 Coffee – Break
15:15 – 16:00: Interactive procedures in stochastic MCDM problems
Maciej Nowak, The Karol Adamiecki University of Economics in

Katowice
19:00 – 20:00: Dinner

SATURDAY, August 2, 2003

8:00 – 9:30: Breakfast
9:30 – 10:15: A tabu search heuristic for the partition coloring problem
Thiago Ferreira de Noronha, Catholic University of Rio de Janeiro
10:15 – 10:45 Coffee – Break
10:45 – 11:30: Heuristics for the one–commodity Pickup–and–Delivery Travelling Salesman Problem
Hipolito H. Perez, University of Laguna
12:30 – 13:30: Lunch
19:00 – 20:00: Dinner
20:00 – 21:00: Excursion by boat in the Curonian Lagoon

SUNDAY, August 3, 2003

8:00 – 9:30: Breakfast
9:00 – 13:00: Excursion by bus to Klaipeda
13:00 – 14:00: Lunch
14:00 – 19:00: Social activity
19:00 – 20:00: Dinner

MONDAY, August 4, 2003

8:00 – 9:30: Breakfast
9:30 – 12:30: Multicriteria Analysis in Dynamic Environment – Selected Problems
Prof. Tadeush Trzaskalik, The Karol Adamiecki University of Economics in Katowice
12:30 – 13:30: Lunch
14:00 – 14:45: Solving nesting problems by hybridising simulated annealing and linear programming
A.Miguel Gomes, University of Porto
14:45 – 15:15 Coffee – Break
15:15 – 16:00: Simulated Annealing with Pareto models
Grazhvydas Felinskas, University of Shiauliai
16:30 – 17:30: Reception by the Major of Neringa
19:00 – 20:00: Dinner

TUESDAY, August 5, 2003

8:00 – 9:30: Breakfast
9:30 – 12:30: Randomized algorithms of optimization and its implementation on quantum computers
Prof. Oleg Granichin, University of St–Petersbourgh

12:30 – 13:30: Lunch
15:30 – 1615: Heuristics, metaheuristics and evaluation models for the Flexible Jobshop Problem
Anthony Caumond, University of Blez Pascale
16:15 – 16:45 Coffe – Break
15:15 – 16:00: On one optimization problem on permutations scheduling the renovation of a branch of N>>1 enterprises with wide–ranging input–output
Dr. Viktor Chistiakov, University of Yaroslavl
19:00 – 20:00: Dinner

WEDNESDAY, August 6, 2003

8:00 – 9:00: Breakfast
9:30 – 12:30: On Generalized Semi-Infinite Optimization and Related Topics
Prof. Gerhard-Wilhelm Weber, University of Ankara
12:30 – 13:30: Lunch
14:00 – 14:45: On some methods solving large–scale optimization problems
Indrek Kaldo, Estonian Business School
14:45 – 15:15 Coffee – Break
15:15 – 16:00: Scenario Updating Method for Stochastic Mixed–Integer Programming Problems
Gugliemo Lulli, University of Rome "La Sapienza"
19:00 – 20:00: Dinner
20:00 – 21: 00 Excursion to the Amber Museum in Nida

THURSDAY, August 7, 2003

8:00 – 9:30: Breakfast
9:30 – 12:00: Closing Lecture
Prof. Jakob Krarup, DIKU, University of Copenhagen
12:30 – 13:30: Lunch
14:00 – 14:45: A General Heuristic for Vehicle Routing Problems with Backhauls
Stefan Ropke, DIKU, University of Copenhagen
14:45 – 15:15: Coffee – Break
15:15 – 16:00: Minimizing operational costs for a container road carrier
Luca Coslovic, University of Trieste
19:00 – 21:00 Farewell Party

FRIDAY, August 8, 2003

Day of Departure

All invited speakers remain for several days to advise the papers and for consultations. They mostly had a very good feeling with the ESI participants. Diploma were offered for participants after ESI.

A number of social activities has been organised, too:
- excursion by bus via Neringa sights (SUNDAY, July 27);
- excursion by boat in the Curonian Lagoon (SATURDAY, August 2);
- bus tour to the Klaipeda city (SUNDAY, August 3);
- excursion to the Amber Museum of Nida (WEDNESDAY, August 6).

Free time participants spent for concerts, sport activities, walking and swimming. Every day matches of volley-ball and football has been organised in the beach, etc.

Feedback and Conclusions

At Thursday, August 7, during the closing session, a feed-back meeting has been organised in order to assess experience of participants. A number of points emerged during the discussion, such as:
- invited speakers were expected to stay 4-5 days that to have a time for advise and consulting of participants;
- tutorial documents might circulate before the beginning of the classes;
- more software demonstration is asked;
- educational perspectives should also be considered within an ESI.

As organisers we would like to mention a number of issues:
- national OR Societies quite often forget to circulate the information about ESI;
- it is very useful to apply to EURO Working Groups, having topics close to the subject of ESI, for diffusion of information, selection of invited speakers, paper reviewing, etc.
- since a lot of various institutions is included to organisation of the ESI, problems of managing their coordination are appearing, which require be considered separately, and using OR science, too.

A feature issue of EJOR has been announced during the ESI. Members of the Scientific Programme Committee are expected to provide some comments to the presented papers in order meet EJOR standards. Then the regular refereeing procedure will apply. We are confident to be able to close the feature issue by the end of 2004.

Annex A: Finance Report

Following exact amounts have been received: 14000 EU from Association of European Operational Research Societies (EURO), 5000 EU from the European Union Grant, 1534 EU from the Ministry of Culture and Education of Lithuania (MCEL), 723 EU from the Lithuanian State foundation on Study and Research (LSFSR). Besides, the Institute of Mathematics and Informatics (Vilnius, Lithuania), and the Vilnius Gediminas Technical University sponsored for organisation (phone, fax, web-site creation and maintaining, e-mail service, transportation) by amounts of 435 EU and 743 EU respectively

Note that the FP5 Programme transferred only an advance payment from offered grant, postponing the transfer of remaining part after report about completed event.

On the other hand expenditures were: Accommodation of invited speakers – 2896 EU, Accommodation of participants – 10000 EU, Feeding of participants – 4500 EU, organisation – 2754 EU travel of invited lecturers – 2200EU. These expenditures are covered by received incomes.

INCOME		EXPENDITURES	
EURO	14000 EU	Travel of invited speakers	2200 EU
Grant of European Union	5000 EU	Invited speakers accommodation	2862 EU
MCEL	1523 EU	Accommodation of participants	10130 EU
LSFSR	723 EU	Feeding	5831 EU
MII	435 EU	Organisation	1401 EU
VGTU	743 EU		
TOTAL	22424 EU	TOTAL	22424 EU

Annex B: Pictures

Picture 1. Participants of EURO Summer Institute with a Vice-Mayor of Neringa Mr. Rimas Giedraitis

Picture 2. Questions for lecturer

Picture 3. In the Conference Hall

Picture 4. Discussion

Picture 5. Excursion to Neringa dunes.

Picture 6.. On the Hill of Thomas Man