

The 13th International Symposium on Operations Research in Slovenia

SOR'15

September 23 – 25, 2015, Bled, Slovenia

<http://sor15.fov.uni-mb.si/>

SOR'15 program



Slovenian Society INFORMATIKA
Section for Operational Research



University of Maribor

Faculty of Organizational Sciences

University of Maribor
Faculty of Organizational Sciences



The Association of European
Operational Research Societies

Wednesday September 23, 2015	Thursday September 24, 2015	Friday September 25, 2015
8.15 – Registration	8.15 – Registration	8.15 – Registration
9.00 – 9.45 Opening ceremony	9.00 – 9.50 Plenary lecture: (PL3) Ou Tang Linköping University, Sweden	9.00 – 9.50 Plenary lecture: (PL5) Sergio Cabello University of Ljubljana, Slovenia
9.50 – 10.40 Plenary lecture: (PL1) Gerhard Wilhelm Weber Middle East Technical University, Turkey	10.00 – 10.45 Parallel sessions: (SS2) IR + (SS3) MO + (S5) P	10.00 – 10.45 Parallel sessions: (S2) G&TA + (S6) F&I + (S7) L&T
10.45 – 11.15 Coffee break	10.45 – 11.15 Coffee break	10.45 – 11.15 Coffee break
11.15 – 12.30 Parallel sessions: (S3) MCDM + (S4) EM&S + (S8) E&HR	11.15 – 12.15 Parallel sessions: (SS2) IR + (SS3) MO + (S5) P	11.15 – 12.00 Parallel sessions: (S10) VA + (S6) F&I + (S7) L&T
12.30 – 13.30 Lunch break	12.20 – 13.20 Lunch break	12.10 – 13.00 Plenary lecture: (PL6) Stefano Cozzini Centro DEMOCRITOS, Italy
13.40 – 14.30 Plenary lecture: (PL2) Nebojša Gvozdenović University of Novi Sad, Serbia	13.30 – 14.20 Plenary lecture: (PL4) Aharon Ben-Tal Technion - Israel Institute of Technology, Israel	
14.40 – 15.40 Parallel sessions: (SS4) BD + (S4) EM&S + (S8) E&HR	14.30 – 15.15 Parallel sessions: (SS1) QMCDM + (S1) MP&O + (S9) ORP	13.10 – 13.40 Closing ceremony
16.15 – 22.30 Excursion	15.15 – 15.45 Coffee break	
	15.45 – 16.45 Parallel sessions: (SS1) QMCDM + (S1) MP&O + (S9) ORP	
	17.00 – 19.00 Social event	

Plenary lectures: 40 minutes for presentation plus 10 minutes for discussion

Contributed presentations: 14 minutes all together for presentation and for discussion

Wednesday

September 23, 2015

8.15 – Registration

9.00 – 9.45 Opening ceremony (Hall I)

9.50 – 10.40 **Plenary lecture** (Hall I, Chair: Mirjana Kljajić Borštnar)

PL1 - **Gerhard Wilhelm Weber**: A New Contribution to Operational Research: Optimal Control of Stochastic Hybrid Systems with Jumps - with Applications in Finance, Economics, Engineering and Biosciences (authors: Gerhard Wilhelm Weber, Emel Savku, Diogo Pinheiro and Nuno Azevedo)

10.45 – 11.15 Coffee break

11.15 – 12.30 Parallel sessions:

(S3) Chair: Tadeusz Trzaskalik Multiple Criteria Decision Making (Hall I)	(S4) Chair: Liljana Ferbar Tratar Econometric Models and Statistics (Hall II)	(S8) Chair: Nataša Kurnoga Environment and Human Resources (Hall III)
<p>S3.1 - Andrej Bregar: Generalisation of Methods for Criteria Weight Derivation Based on Discordance Information</p> <p>S3.2 - Petra Grošelj and Lidija Zadnik Stirn: IGMDEA and TFNGMDEA Methods for Deriving Weights from Interval-Valued Comparison Matrices in AHP</p> <p>S3.3 - Slawomir Jarek: Approximating Random Indexes in the Analytical Hierarchy Process</p> <p>S3.4 - Nolberto Munier: A New Method Aiming at More Realistic Modelling and Dependable Results in Multicriteria Decision-Making</p> <p>S3.5 - Tunjo Perić and Zoran Babić: A New Linearization Approach for Solving Multi Objective Linear Fractional Programming Problems</p>	<p>S4.1 - Josip Arnerić, Ivana Lolić and Tea Poklepović: Algorithms for Maximum Likelihood Estimation of GARCH Models</p> <p>S4.2 - Marko Bohanec, Mirjana Kljajić Borštnar and Marko Robnik-Šikonja: Feature Subset Selection for B2b Sales Forecasting</p> <p>S4.3 - Michaela Chocholatá and Andrea Furková: Income Convergence of the EU Regions: Spatial Econometric Approach</p> <p>S4.4 - Snježana Pivac, Branka Marasović and Dujam Kovač: Economic and Demographic Determinants of Demand for Life Insurance</p> <p>S4.5 - Berislav Žmuk: The Impact of Intracluster Homogeneity on the Survey Costs: A Croatian Business Survey</p>	<p>S8.1 - Alenka Brezavšček and Alenka Baggia: Analysis of Students' Flow in Higher Education Study Programmes Using Discrete Homogeneous Markov Chains</p> <p>S8.2 - Katarína Cechlárová, Pavlos Eirinakis, Tamás Fleiner, Dimitrios Magos, Ioannis Mourtos and Eva Oceláková: Approximation Algorithms for the Teachers Assignment Problem</p> <p>S8.3 - Nataša Erjavec and Saša Jakšič: Regional Unemployment in Croatia: Evidence from Dynamic Panel Model</p> <p>S8.4 - Jaroslav Janáček and Marek Kvet: Emergency System Design with Temporarily Failing Centers</p> <p>S8.5 - Alenka Kavkler and Jani Bekő: Reestimating the Purchasing Power Parity System for Emerging Asian Countries</p>

12.30 – 13.30 Lunch break

13.40 – 14.30 **Plenary lecture** (Hall I, Chair: Janez Povh)

PL2 - **Nebojša Gvozdencić**: OR Techniques in Real World Vehicle Routing

Wednesday

September 23, 2015

14.40 – 15.40 Parallel sessions:

(SS4) Chair: Janez Povh Big Data (Hall I)	(S4) Chair: Snježana Pivac Econometric Models and Statistics (Hall II)	(S8) Chair: Katarína Cechlárová Environment and Human Resources (Hall III)
<p>SS4.1 - Tanja Gologranc, Janja Jerebic, Jaka Kranjc, Borut Lužar, Luka Mali, Janez Povh and Drago Bokal: On Applying Mathematical Models of Frequency Assignment to Wi-Fi Throughput Optimization</p> <p>SS4.2 - Lukáš Rapant, Kateřina Slaninová and Jan Martinovič: Traffic Incident Classification Using Bayesian Approach and Markov Chains</p> <p>SS4.3 - Tomáš Režnar, Jan Martinovič, Kateřina Slaninová and Ekaterina Grakova: Probabilistic Time-Dependent Vehicle Routing Problem</p> <p>SS4.4 - Darko Zelenika, Janez Povh and Bernard Ženko: Segmentation and Detection of Text in Document Images</p>	<p>S4.6 - Ksenija Dumičić, Berislav Žmuk and Anita Čeh Časni: Housing Affordability Levels in Selected European Countries: Hierarchical Clustering Approach</p> <p>S4.7 - Liljana Ferbar Tratar: The Performance of the Modified Holt-Winters Method: A Study of 1428 Monthly Series From M3-Competition</p> <p>S4.8 - Ervin Strmcnik and Liljana Ferbar Tratar: The Comparison of Holt-Winters Method and Multiple Regression Method: A Case of Monthly Heat Load Forecasting in the Company Energetika Ljubljana (Slovenia)</p> <p>S4.9 - Ana Bilandžić, Marina Jeger and Nataša Šarlija: How to Improve Interpretability of the Logistic Regression Model</p>	<p>S8.6 - Tina Kocjančič, Jaka Žgajnar and Luka Juvančič: Incorporation of System Based Emergy Indicators in Optimisation of Dairy Production in Slovenia</p> <p>S8.7 - Nataša Kurnoga and Mirjana Čižmešija: Has the Long-Term Recession Changed Managers' Assessments and Expectations in the Croatia's Retail Trade Sector?</p> <p>S8.8 - Andrea Majić, Adela Has and Marijana Zekić-Sušac: Discrete-Event Simulation Model of Customer Support Service in Telecommunications</p> <p>S8.9 - Slavko Šimundić and Danijel Barbarić: Computer Crimes in Modern Society</p>

16.15 – 22.30 **Excursion with dinner**

Guided tour to old town Radovljica (<http://www.radolca.si/en/>), visit of Avsenik museum (<http://www.avsenik.com/en/Museum/Museum-Avsenik>) and dinner at restaurant Avsenik (<http://www.avsenik.com/en/Restaurant/Our-offer>) in Begunje

Thursday

September 24, 2015

8.15 – Registration

9.00 – 9.50 **Plenary lecture** (Hall I, Chair: Marija Bogataj)

PL3 - Ou Tang: Remanufacturing and Core Acquisition (authors: Shuoguo Wei and Ou Tang)

10.00 – 10.45 Parallel sessions:

(SS2) Chair: Marija Bogataj Inventory Research (Hall I)	(SS3) Chair: Bogdan Filipič Metaheuristic Optimization (Hall II)	(S5) Chair: Janez Kušar Production (Hall III)
<p>SS2.1 - Robert W. Grubbström: Some Aspects on the Distribution of the Net Present Value of a Stochastic Cash Flow Generated by a Compound Renewal Process</p> <p>SS2.2 - Marko Jakšič: Near-Optimality of Myopic Policy for the Dual Sourcing Inventory Problem with Stochastic Capacitated Supplier</p> <p>SS2.3 - Athanassios Nikolakopoulos and Ioannis Ganas: Inventory Routing and Control Models for the Distribution of Industrial Gases: A Multiperiod Deterministic and a Dynamical Predictive Approach</p>	<p>SS3.1 - Petra Drevenšek, Vida Vukašinović, Gregor Papa and Peter Korošec: Suitability of MASA Algorithm for Traveling Thief Problem</p> <p>SS3.2 - Tadej Kanduč and Blaž Rodič: Factory Transport Costs Optimisation with a Novel Heuristic Algorithm</p> <p>SS3.3 - Martin Pečar: Mobile Teams Problem</p>	<p>S5.1 - Đula Borozan and Luka Borozan: The Stationarity of Per Capita Electricity Consumption in Croatia Allowing for Structural Break(S)</p> <p>S5.2 - Helena Gaspars-Wieloch: Innovative Products and Newsvendor Problem Under Uncertainty Without Probabilities</p> <p>S5.3 - Eva Jordan, Tomaž Berlec, Marko Starbek and Janez Kušar: A Lean Production Process - Today's Destination of Companies</p>

10.45 – 11.15 Coffee break

11.15 – 12.15 Parallel sessions:

(SS2) Chair: R. W. Grubbström Inventory Research (Hall I)	(SS3) Chair: Jurij Šilc Metaheuristic Optimization (Hall II)	(S5) Chair: H. Gaspars-Wieloch Production (Hall III)
<p>SS2.4 - Erica Pastore, Arianna Alfieri and Giulio Zotteri: Managing Different Demand Classes in a Spare Parts Inventory: a Practical Dynamic Allocation Strategy</p> <p>SS2.5 - Lorenzo Ros-McDonnell and Maria Victoria de-la-Fuente Aragon: Modelling the Crude Oil Storage Management</p> <p>SS2.6 - David Bogataj and Marija Bogataj: Floating Points of a Cold Supply Chain in an Environment of the Changing Economic Growth</p> <p>SS2.7 - David Bogataj, Marija Bogataj, Damjana Drobne, Lorenzo Ros-McDonnell, Rebeka Rudolf and Domen Hudoklin: Investments in Smart Nano-Control Systems in Cold Supply Chains</p>	<p>SS3.4 - Omer Faruk Yilmaz and Mehmet Bulent Durmusoglu: Hybrid Metaheuristic Algorithm for a New Scheduling Problem in Hybrid Manufacturing Environment</p> <p>SS3.5 - Tulug Figen Yilmaz and Pinar Karagoz: Metaheuristic Based Automated Evaluation Method for Public Investment Projects</p> <p>SS3.6 - Hugo Zupan, Niko Herakovič and Janez Žerovnik: A Hybrid Metaheuristic for Job-Shop Scheduling with Machine and Sequence-Dependent Setup Times</p> <p>SS3.7 - Bogdan Filipič, Miha Mlakar and Tea Tušar: Multiobjective Optimization of Process Parameters in Steel Production</p>	<p>S5.4 - Gregory Gurevich, Baruch Keren and Yossi Hadad: The Robust Binomial Approach to the Machine Interference Problem with Different Groups of Identical Machines and Preemptive Priority</p> <p>S5.5 - David Kaljun and Janez Žerovnik: On Modelling of Spatial Light Distribution of LED with Attached Secondary Optics</p> <p>S5.6 - Michaela Staničková: Evaluation of Performance Among EU28 NUTS 2 Regions – Context-Dependent Dea to Catch-Up/Down Effect</p> <p>S5.7 - Ozen Yavas and Ayca Altay: A Hybrid Metaheuristic Approach for Production Scheduling</p>

12.20 – 13.20 Lunch break

Thursday

September 24, 2015

13.30 – 14.20 **Plenary lecture** (Hall I, Chair: Lidija Zadnik Stirn)

PL4 - **Aharon Ben-Tal**: Robust Solutions of Uncertain Optimization Problems under Ambiguous Stochastic Data

14.30 – 15.15 Parallel sessions:

(SS1) Chair: Vladislav Rajkovič Qualitative Multiple Criteria Decision Making (Hall I)	(S1) Chair: Drago Bokal Mathematical Programming and Optimization (Hall II)	(S9) Chair: Marijana Zekić-Sušac OR Perspectives (Hall III)
<p>SS1.1 - Marko Bohanec, Nejc Trdin and Branko Kontić: A Qualitative Multi-Criteria Model for the Evaluation of Electric Energy Production Technologies in Slovenia</p> <p>SS1.2 - Marko Debeljak, Sašo Džeroski, Vladimir Kuzmanovski, Jonathan Marks-Perreau, Aneta Trajanov and B. Real: Decision Support Modelling for Environmentally Safe Application of Pesticides Used in Agriculture</p> <p>SS1.3 - Mirjana Kljajić Borštnar, Tomi Ilijaš and Andreja Pucihar: Assessment of Cloud High Performance Computing Potential for SMEs</p>	<p>S1.1 - Nejc Bat, Marko Kobal and Tomi Ilijaš: Analysis of Use Cases Using HPC Services in the Cloud</p> <p>S1.2 - Milan Hladík: Interval Convex Quadratic Programming Problems in a General Form</p> <p>S1.3 - Ľudmila Jánošíková and Michal Haviar: Hybrid Genetic Algorithms For the Capacitated p-Median Problem</p>	<p>S9.1 - Frank Chen and Houmin Yan: Weather Risk Hedging - an Operations Perspective</p> <p>S9.2 - Jawad Elomari: Racing with Reset Utilizing Full Information</p> <p>S9.3 - Maciej Nowak and Tadeusz Trzaskalik: Optimal and Near-Optimal Strategies in Solving Bi-Criteria Discrete Stochastic Dynamic Programming Problem</p>

15.15 – 15.45 Coffee break

15.45 – 16.45 Parallel sessions:

(SS1) Chair: Marko Bohanec Qualitative Multiple Criteria Decision Making (Hall I)	(S1) Chair: Marko Kobal Mathematical Programming and Optimization (Hall II)	(S9) Chair: Janez Žerovnik OR Perspectives (Hall III)
<p>SS1.4 - Matej Mihelčič and Marko Bohanec: Empirical Comparison of three Methods for Approximating DEX Utility Functions</p> <p>SS1.5 - Uroš Rajkovič and Vladislav Rajkovič: Managing Different Interests in Group Decision Making</p> <p>SS1.6 - Črtomir Rozman, Karmen Pažek, Viljem Pavlovič, Marko Bohanec and Martin Pavlovič: Application of Multi Criteria DEX Model in HOP Breeding</p> <p>SS1.7 – M. Janackova and Alzbeta Szendreyova: Time-Distance Versus Utility in the Public Service System Design</p>	<p>S1.4 - Maja Repnik and Drago Bokal: A Basis for Taxonomy of Fuzzy Linear Programming Methods</p> <p>S1.5 - Galina Stoyanova Panayotova and Georgi Petrov Dimitrov: Design of Web-Based Information System for Optimization of Portfolio</p> <p>S1.6 - Ilko Vrankić and Mira Krpan: Duality in Monopoly</p> <p>S1.7 - Michal Koháni: Various Modifications of Greedy Algorithm for the Zone Partitioning Problem in Zone Tariff Systems</p>	<p>S9.4 - Andrei Orlov: On the Optimization Approach to Polymatrix Games</p> <p>S9.5 - Zoran Selinger and Marijana Zekić-Sušac: Using Data Mining Methods in Web Analytics</p> <p>S9.6 - Alexander S. Strekalovskiy: Nonconvex Optimization: Modern View</p> <p>S9.7 - Lukáš Melecký and Jana Hančlová: Measuring Environmental Efficiency of European Regions: A Meta-Frontier Approach</p>

17.00 – 19.00 **Social event**

Guided visit to Triglav National Park Visiting Center at Bled (<http://www.tnp.si/experience/C205/>) with tasting of Bled cream cake (<http://www.bled.si/en/what-to-see/symbols-of-bled/cream-cake>)

Friday

September 25, 2015

8.15 – Registration

9.00 – 9.50 **Plenary lecture** (Hall I, Chair: Janez Žerovnik)
 PL5 - **Sergio Cabello**: Two Applications of Geometric Optimization

10.00 – 10.45 Parallel sessions:

(S2) Chair: Janez Žerovnik Graphs and Their Applications (Hall I)	(S6) Chair: Vlasta Bahovec Finance and Investments (Hall II)	(S7) Chair: Marija Bogataj Location and Transport (Hall III)
S2.1 - Anna Azzi, Daria Battini, Alessandro Persona and Fabio Sgarbossa: Logistics Cycle Indexes: Supply Network Analysis Takes a Step Further S2.2 - Ján Bendík: Improving the Exact Algorithm for Solving the Public Service System Design in the Branching S2.3 - Aleksander Vesel: Star Coloring of Fibonacci Cubes	S6.1 - Josip Arnerić, Mirjana Čižmešija and Petar Sorić: Analysis of the Leverage Effect – Evidence from Ljubljana Stock Exchange S6.2 - Anita Čeh Časni, Ksenija Dumičić and Irena Palić: Flexibility of Real and Nominal Wages in Slovenia and Croatia: Var Approach S6.3 - Tihana Škrinjarić: Time Varying CAPM Betas on Zagreb Stock Exchange	S7.1 - Peter Czimmermann and Štefan Peško: A Polynomial Algorithm for a Particular Obnoxious Facility Location Problem S7.2 - Samo Drobne and Mitja Lakner: Intramax and Constraints S7.3 - Eloy Hontoria and Darko Aleksovski: Practical Logistic Applications of Small Scale Traveling Salesman Problem for Small and Medium Enterprises

10.45 – 11.15 Coffee break

11.15 – 12.00 Parallel sessions:

(S10) Chair: Daria Battini Various Applications (Hall I)	(S6) Chair: Ksenija Dumičić Finance and Investments (Hall II)	(S7) Chair: Samo Drobne Location and Transport (Hall III)
S10.1 - Mirjana Pejić Bach and Jovana Zoroja: eGovernment Utilization in European Landscape: Hierarchical Cluster Analysis S10.2 - Draženka Čizmić: Higher-Level Indices in the Consumer Price Index	S6.4 - Dajana Cvrilje, Vlasta Bahovec and Irena Palić: The Analysis of the Financial Education Impact on Investment Behavior in Croatia: Ordered Logistic Regression Approach S6.5 - Renata Kožul Blaževski and Jelena Vidović: Causality between State Aid and GDP in European Countries S6.6 - Tihana Škrinjarić and Boško Šego: Dynamic Modeling of Stock and Bond Return Correlation in Croatia	S7.4 - Elza Jurun, Nada Ratković and Ivan Marijanović: Croatian Maritime Freight Transport in the Environment of Schengen Area S7.5 - Marek Kvet and Jaroslav Janáček: Semi-Fair Deployment of the Service Centers in a Transportation Network S7.6 - Polona Pavlovčič Prešeren, Bojan Stopar, Miran Kuhar and Oskar Sterle: Fuzzy Logic Based Quality Assessment in Kinematic GNSS-Positioning

12.10 – 13.00 **Plenary lecture** (Hall I, Chair: Mirjana Kljajić Borštnar)
 PL6 - **Stefano Cozzini**: HPC as a Key-Enabling Technology

13.10 – 13.40 Closing ceremony (Hall I)

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Program Committee:

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