

Datum: 2. 3. 2020

Zadeva: **Poročilo SDI-SOR o SOR'19**

Sekcija za operacijske raziskave Slovenskega društva INFORMATIKA (Litostrojska cesta 54, SI 1000 Ljubljana, ki ji predseduje prof. dr. Lidija Zadnik Stirn, je v dneh od 25. do 27. septembra 2019 organizirala v hotelu Astoria na Bledu 15. mednarodni simpozij iz operacijskih raziskav (The 15th International Symposium on Operational Research – SOR'19).

Lokalni soorganizator simpozija je bila Fakulteta za organizacijske študije, Univerze v Mariboru (UM, FOV), Kidričeva cesta 55a, Kranj, soorganizator pa je bila tudi Univerza v Ljubljani, Fakulteta za strojništvo, Aškerčeva cesta 6, Ljubljana.

SOR'19 je bil strokovno brežhibno organiziran po zaslugi šestih članov **Organizacijskega odbora SOR'19**:

- P. Gorjanc, University of Maribor, Faculty of Organizational Sciences, Kranj, Slovenia, chair
- S. Drobne, University of Ljubljana, Faculty of Civil and Geodetic Engineering, Ljubljana, Slovenia, co-chair
- J. Povh, University of Ljubljana, Faculty of Mechanical Engineering, Ljubljana, Slovenia, co-chair
- N. Fileš, Slovenian Society Informatika, Ljubljana
- M. Kljajić Borštnar, University of Maribor, Faculty of Organizational Science, Kranj, Slovenia
- B. Slabe, University of Maribor, Faculty of Organizational Sciences, Slovenia
- L. Zadnik Stirn, University of Ljubljana, Biotechnical Faculty, Ljubljana, Slovenia

Za kakovostno raven vabljenih prispevkov in recenziranih referatov so poskrbeli člani Programskega odbora SOR'19 in recenzenti prispevkov za SOR'19.

Člani **Programskega odbora SOR'19** so bili:

- L. Zadnik Stirn, University of Ljubljana, Biotechnical Faculty, Ljubljana, Slovenia, chair
- M. Kljajić Borštnar, University of Maribor, Faculty of Organizational Sciences, Kranj, Slovenia, co-chair
- J. Žerovnik, University of Ljubljana, Faculty of Mechanical Engineering, Ljubljana, Slovenia, co-chair
- J. Arnerić, University of Zagreb, Faculty of Economics and Business, Zagreb, Croatia
- S. Bogaerts, PRACE - The Partnership for Advanced Computing in Europe, Brussels, Belgium
- M. Bogataj, Zavod INRISK - Inštitut za raziskavo sistemov izpostavljenih rizikom, Slovenia
- M. Bohanec, Jožef Stefan Institute, Department of Knowledge Technologies, Ljubljana, Slovenia
- D. Bokal, University of Maribor, Faculty of Natural Sciences and Mathematics, Maribor, Slovenia
- A. Brodnik, University of Primorska, Faculty of Mathematics, Natural Sciences and Information Technologies, Koper, Slovenia
- S. Cabello, University of Ljubljana, Faculty of Mathematics and Physics, Ljubljana, Slovenia
- K. Cechlarova, P. J. Šafarik University, Faculty of Science, Košice, Slovakia
- T. Csendes, University of Szeged, Department of Applied Informatics, Szeged, Hungary
- V. Čančer, University of Maribor, Faculty of Business and Economics, Maribor, Slovenia
- S. Drobne, University of Ljubljana, Faculty of Civil and Geodetic Engineering, Ljubljana, Slovenia

- K. Dumičić, University of Zagreb, Faculty of Economics and Business, Zagreb, Croatia
- L. Ferbar Tratar, University of Ljubljana, Faculty of Economics, Ljubljana, Slovenia
- H. Gasparis-Wieloch, Poznan University of Economics and Business, Poznan, Poland
- E. Hontoria, Technical University of Cartagena, Business Management Department, Cartagena, Spain
- J. Jablonsky, University of Economics, Faculty of Informatics and Statistics, Prague, Czech Republic
- S. Klavžar, University of Ljubljana, Faculty of Mathematics and Physics, Ljubljana, Slovenia
- D. Kofjač, University of Maribor, Faculty of Organizational Sciences, Kranj, Slovenia
- J. Kušar, University of Ljubljana, Faculty of Mechanical Engineering, Ljubljana, Slovenia
- U. Leopold-Wildburger, University of Graz, Graz, Austria
- A. Lisec, University of Ljubljana, Faculty of Civil and Geodetic Engineering, Ljubljana, Slovenia
- Z. Lukač, University of Zagreb, Faculty of Economics and Business, Zagreb, Croatia
- M. Pejić Bach, University of Zagreb, Faculty of Economics and Business, Zagreb, Croatia
- M. Perc, University of Maribor, Faculty of Natural Sciences and Mathematics, Maribor, Slovenia
- T. Perić, University of Zagreb, Faculty Economics and Business, Zagreb, Croatia
- S. Pivac, University of Split, Faculty of Economics, Department for Quantitative Methods, Split, Croatia
- J. Povh, University of Ljubljana, Faculty of Mechanical Engineering, Ljubljana, Slovenia
- V. Rajkovič, University of Maribor, Faculty of Organizational Sciences, Kranj, Slovenia
- M. S. Rauner, University of Vienna, Department of Innovation and Technology Management, Vienna, Austria
- R. Sotirov, Department of Econometrics and Operations Research, Tilburg University, The Netherlands
- J. Šilc, Jožef Stefan Institute, Computer Systems Department, Ljubljana, Slovenia
- K. Šorić, Zagreb School of Economics and Management, Zagreb, Croatia
- O. Tang, Linköping University, Department of Management and Engineering, Linköping, Sweden
- T. Trzaskalik, University of Economics, Department of Operational Research Katowice, Poland
- L. Van Wassenhove, INSEAD Europe Campus, INSEAD Humanitarian Research Group, France
- G. W. Weber, Poznan University of Technology, Faculty of Engineering Management, Poznan, Poland
- M. Zekić Sušac, University of Osijek, Faculty of Economics, Croatia

Recenzenti prispevkov za SOR'19 so bili:

- Josip Arnerić, University of Zagreb, Faculty of Economics and Business, Zagreb, Croatia
- Marija Bogataj, University of Ljubljana, Faculty of Economics, and SEB, and INRISK, Slovenia
- Marko Bohanec, Jožef Stefan Institute, Department of Knowledge Technologies, Ljubljana, Slovenia
- Drago Bokal, University of Ljubljana, Faculty of Mathematics and Physics, Ljubljana, Slovenia
- Boštjan Brešar, University of Maribor, Faculty of Natural Sciences and Mathematics, Maribor, Slovenia
- Andrej Brodnik, University of Primorska, Faculty of Mathematics, Natural Sciences and Information Technologies, Koper, Slovenia
- Sergio Cabello, University of Ljubljana, Faculty of Mathematics and Physics, Ljubljana, Slovenia
- Katarína Cechlárová, P. J. Šafarik University, Faculty of Science, Košice, Slovakia
- Vesna Čančer, University of Maribor, Faculty of Economics and Business
- Samo Drobne, University of Ljubljana, Faculty of Civil and Geodetic Engineering, Ljubljana, Slovenia
- Ksenija Dumičić, University of Zagreb, Faculty of Economics and Business, Zagreb, Croatia
- Liljana Ferbar Tratar, University of Ljubljana, Faculty of Economics, Ljubljana, Slovenia
- Boštjan Gabrovšek, University of Ljubljana, Faculty of Mechanical Engineering, Ljubljana, Slovenia

- Helena Gasparis-Wieloch, Poznan University of Economics and Business, Poznan, Poland
- Tanja Gologranc, University of Maribor, Faculty of Natural Sciences and Mathematics, Maribor, Slovenia
- Niko Herakovič, University of Ljubljana, Faculty of Mechanical Engineering, Ljubljana, Slovenia
- Eloy Hontoria, Technical University of Cartagena, Business Management Department, Cartagena, Spain
- Sandi Klavžar, University of Ljubljana, Faculty of Mathematics and Physics, Ljubljana, Slovenia
- Mirjana Kljajić Borštnar, University of Maribor, Faculty of Organizational Sciences, Kranj, Slovenia
- Andrej Košir, University of Ljubljana, Faculty of Electrical Engineering, Ljubljana, Slovenia
- Janez Kušar, University of Ljubljana, Faculty of Mechanical Engineering, Ljubljana, Slovenia
- Vasja Leban, University of Ljubljana, Biotechnical Faculty, Ljubljana, Slovenia
- Anka Lisec, University of Ljubljana, Faculty of Civil and Geodetic Engineering, Ljubljana, Slovenia
- Zrinka Lukač, University of Zagreb, Faculty of Economics and Business, Zagreb, Croatia
- Jerzy Michnik, University of Economics, Department of Operational Research Katowice, Poland
- Karmen Pažek, University of Maribor, Faculty of Agriculture and Life Sciences
- Aljoša Peperko, University of Ljubljana, Faculty of Mechanical Engineering, Ljubljana, Slovenia
- Tunjo Perić, University of Zagreb, Faculty Economics and Business, Department of Informatics, Zagreb, Croatia
- Snježana Pivac, University of Split, Faculty of Economics, Split, Croatia
- Janez Povh, University of Ljubljana, Faculty of Mechanical Engineering, Ljubljana, Slovenia
- Uroš Rajkovič, University of Maribor, Faculty of Organizational Sciences, Kranj, Slovenia
- Vladislav Rajkovič, University of Maribor, Faculty of Organizational Sciences, Kranj, Slovenia
- Ewa Roszkowska, University of Bialystok, Faculty of Economics and Management
- Črtomir Rozman, University of Maribor, Faculty of Agriculture and Life Sciences
- Gregor Rus, University of Maribor, Faculty of Organizational Sciences, Kranj, Slovenia
- Aneta Trajanov, Jožef Stefan Institute, Computer Systems Department, Ljubljana, Slovenia
- Tadeusz Trzaskalik, University of Economics, Department of Operational Research Katowice, Poland
- Tomasz Wachowicz, University of Economics, Department of Operational Research Katowice, Poland
- Aleksander Vesel, University of Maribor, Faculty of Natural Sciences and Mathematics, Maribor, Slovenia
- Lidija Zadnik Stirn, University of Ljubljana, Biotechnical Faculty, Ljubljana, Slovenia
- Marijana Zekić Sušac, University of Osijek, Faculty of Economics, Croatia
- Janez Žerovnik, University of Ljubljana, Faculty of Mechanical Engineering, Ljubljana, Slovenia

Simpozija se je udeležilo 115 strokovnjakov s področja operacijskih raziskav z univerz, inštitutov, podjetij in javne uprave in ena spremljevalna oseba. Izmed njih je bilo 70 tujih (iz 15-tih držav) in 46 domačih.

Udeleženci so predstavili 5 vabljenih predavanja in 101 recenziran referat, ki so jih napisali 203 avtorji in soavtorji (od tega jih je bilo 79 iz Slovenije in 124 iz tujine). Posebej je treba omeniti 3 vabljenе predavatelje iz tujine in 2 iz Slovenije in častne govornike na otvoritveni slovesnosti, med katerimi gre posebno mesto predsednikom oziroma predstavnikom društev za operacijske raziskave naslednjih držav.

Častni govorniki so bili:

- prof. dr. Lidija Zadnik Stirn, predsednica Sekcije za operacijske raziskave, Slovensko društvo Informatika;
- g. Niko Schlamberger, predsednik Slovenskega društva Informatika;
- prof. dr. Iztok Podbregar, dekan Fakultete za organizacijske vede, Univerza v Mariboru;

- prof. dr. Janez Povh v imenu Fakultete za strojništvo, Univerze v Ljubljani;
- prof. dr. Immanuel Bomze, predsednik EURO (The Association of European Operational Research Societies);
- dr. Sarah Fores, generalna managerka EURO (The Association of European Operational Research Societies);
- prof. dr. Zrinka Lukač, predsednica Hrvaškega društva za operacijske raziskave.

Vabljeni predavatelji (plenarna predavanja) so bili:

- Acad. Prof. Dr. Ivan Bratko, Faculty of Computer and Information Science, University of Ljubljana, Ljubljana, Slovenia,
- Prof. Dr. Mirjana Čižmešija, University of Zagreb, Faculty of Economics and Business, Zagreb, Croatia,
- Assoc. Prof. Dr. Tibor Illés, Budapest University of Technology and Economics, Institute of Mathematics, Budapest, Hungary,
- Prof. Dr. Joanna Józefowska, Poznan University of Technology, Poznan, Poland (the EURO plenary),
- Prof. Dr. Matej Praprotnik, Laboratory for Molecular Modeling, National Institute of Chemistry, Ljubljana, Slovenia.

Na SOR'19 smo organizirali **sedem posebnih sekcij**; in sicer:

- Application of Operation Research in Agriculture and Agribusiness Management (prof. dr. Karmen Pažek and prof. dr. Črtomir Rozman, University of Maribor, Faculty of Agriculture and Life Sciences) in SDI.
- Graph Theory and Algorithms (prof. dr. Sandi Klavžar, University of Ljubljana, Faculty of Mathematics and Physics, Ljubljana and University of Maribor, Faculty of Natural Sciences and Math, Maribor, Slovenia) in SDI.
- Optimization in Human Environments (prof. dr. Andrej Košir, University of Ljubljana, Faculty of Electrical Engineering and prof. Dr. Drago Bokal, University of Maribor, Faculty of Natural Sciences and Mathematics) in SDI.
- Formal and behavioral issues in MCDM (prof. dr. Tadeusz Trzaskalik and prof. dr. Tomasz Wachowicz, University of Economics at Katowice) in SDI.
- High-Performance Computing and Big Data (assoc. prof. dr. Janez Povh, University of Ljubljana, Faculty of mechanical engineering, Ljubljana and assoc. prof. dr. Mirjana Kljajić Borštnar, University of Maribor, Faculty of organizational sciences, Kranj) in SDI.
- Towards Industry 4.0.(prof. dr. Niko Herakovič and assoc. prof. dr. Janez Kušar, University of Ljubljana, Faculty of mechanical engineering, Ljubljana) in SDI.
- System Modelling & Soft Operational Research (prof. dr. Jerzy Michnik, University of Economics at Katowice) in SDI.

(Posebne) sekcije na SOR'19 je vodilo **šestindvajset priznanih domačih in tujih strokovnjakov**; in sicer:

- Drago Bokal, University of Ljubljana, Faculty of Mathematics and Physics, Ljubljana, Slovenia
- Marija Bogataj, University of Ljubljana, Faculty of Economics, and SEB, and INRISK, Slovenia
- Immanuel Bomze, The Association of European Operational Research Societies (EURO)
- Katarína Cechlárová, P. J. Šafarik University, Faculty of Science, Košice, Slovakia
- Vesna Čančer, University of Maribor, Faculty of Economics and Business
- Ksenija Dumičić, University of Zagreb, Faculty of Economics and Business, Zagreb, Croatia
- Liljana Ferbar Tratar, University of Ljubljana, Faculty of Economics, Ljubljana, Slovenia
- Niko Herakovič, University of Ljubljana, Faculty of Mechanical Engineering, Ljubljana, Slovenia
- Eloy Hontoria, Technical University of Cartagena, Business Management Department, Cartagena, Spain
- Sandi Klavžar, University of Ljubljana, Faculty of Mathematics and Physics, Ljubljana, Slovenia
- Mirjana Kljajić Borštnar, University of Maribor, Faculty of Organizational Sciences, Kranj, Slovenia

- Andrej Košir, University of Ljubljana, Faculty of Electrical Engineering, Ljubljana, Slovenia
- Janez Kušar, University of Ljubljana, Faculty of Mechanical Engineering, Ljubljana, Slovenia
- Jerzy Michnik, University of Economics, Department of Operational Research Katowice, Poland
- Karmen Pažek, University of Maribor, Faculty of Agriculture and Life Sciences
- Mirjana Pejić Bach, University of Zagreb, Faculty of Economics and Business, Zagreb, Croatia
- Tunjo Perić, University of Zagreb, Faculty Economics and Business, Department of Informatics, Zagreb, Croatia
- Janez Povh, University of Ljubljana, Faculty of Mechanical Engineering, Ljubljana, Slovenia
- Vladislav Rajkovič, University of Maribor, Faculty of Organizational Sciences, Kranj, Slovenia
- Črtomir Rozman, University of Maribor, Faculty of Agriculture and Life Sciences
- Niko Schlamberger, Slovenia Society Informatica, Ljubljana, Slovenia
- Tihana Škrinjarić, University of Zagreb, Faculty Economics and Business, Zagreb, Croatia
- Tadeusz Trzaskalik, University of Economics, Department of Operational Research Katowice, Poland
- Tomasz Wachowicz, University of Economics, Department of Operational Research Katowice, Poland
- Lidija Zadnik Stirn, University of Ljubljana, Biotechnical Faculty, Ljubljana, Slovenia
- Janez Žerovnik, University of Ljubljana, Faculty of Mechanical Engineering, Ljubljana, Slovenia.

Proceedings of the 15th International Symposium on Operational Research, ki so ga uredili prof. dr. Lidija Zadnik Stirn, prof. dr. Mirjana Kljajić Borštner, prof. dr. Janez Žerovnik, doc. dr. Samo Drobne in izr. prof. dr. Janez Povh bo **eferiran** v: ISI (Index to Scientific and Technical Proceedings on CD-ROM and ISI/ISTP&B online database), Current Mathematical Publications, Mathematical Review, MathSci, Zentrallblatt für Mathematics, Mathematics Abstracts, MATH on STN International CompactMath, INSPEC, Journal of Economic Literature.

Referati v zborniku del so razdeljeni v šestnajst poglavij (številka v oklepaju pomeni število prispevkov v sekciji): Plenary Lectures (5); sedem posebnih sekcij: Application of Operation Research in Agriculture and Agribusiness Management (5), Formal and Behavioral Issues in MCDM (7), Graph Theory and Algorithms (12), High-Performance Computing and Big Data (4), Optimization in Human Environments (7), System Modelling & Soft Operational Research (5), Towards Industry 4.0 (5), in osem sekcij: Econometric Models and Statistics (10), Environment and Social Issues (6), Finance and Investments (11), Location and Transport, Graphs and their Applications (4), Mathematical Programming and Optimization (9), Multi-Criteria Decision-Making (6), Human Resources (4), and Production and Management (6).

Vsebina in struktura prispevkov je bila tokrat nekoliko usmerjena v korist problemskim sklopom, čeprav je bilo tudi veliko zelo kakovostnih metodoloških prispevkov. Opazno je, da se operacijske raziskave vse bolj vključujejo v neposredne gospodarske probleme; navkljub velikemu številu udeležencev, ki so običajno avtorji, zlasti teoretičnih prispevkov, z univerz in raziskovalnih inštitutov. Nadalje je potrebno poudariti, da je bilo med avtorji veliko predstavnikov mlajše generacije, kar pomeni, da imajo operacijske raziskave tudi, kar se tiče kadrov, svetlo prihodnost.

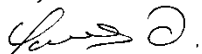
Kot v preteklih letih (SOR'05 do SOR'17), smo žal tudi ob tem dogodku opazili, da je bila kljub pravočasnemu in ustreznemu informiranju občutna premajhna odzivnost uporabnikov OR-raziskovanja; pri tem mislimo tako zastopnike javnih sistemov kot na zastopnike industrije. To so predvsem energetske, okoljevarstveni, elektroenergetski, gradbeniški, transportni, vojaški strokovnjaki, med drugimi so to strokovnjaki iz managementa industrijskih podjetij in proizvodnje. To so skratka vsi tisti, ki bi pri svojem delu morali intenzivno uporabljati metode OR. V primeru, da bi bilo srečanje tako izpopolnjeno, k čemur bienalni simpoziji iz OR težijo, bi lahko prišlo že v okviru simpozija do začetka reševanja problemov, ki se v Sloveniji v okviru OR s praktičnega stališča zdijo kritični. To so predvsem identifikacija problemov in identifikacija ljudi ter skupin, ki se tako na strani uporabnikov kot na strani izvajalcev lahko soočijo z njimi. V takšnem primeru bi lahko prišlo do zametka primernih delovnih skupin. Smatramo, da bi se v bodoče moralo Ministrstvo za gospodarstvo bolj aktivno vključiti v delo simpozija.

Na koncu lahko ugotovimo, da je SOR'19, ki je tokrat obeležil že 15. izvedbo, presegel naša pričakovanja tako v strokovnem kot tudi moralnem pogledu. Velika udeležba tujih strokovnjakov je potrdila zaupanje v naše strokovne sile, obenem pa nudila domačim strokovnjakom priložnost, da se seznanijo z dosežki, ki razvitemu svetu pomenijo generator njihove diferencialne rente.

SOR'19 sta finančno podprla EURO (Association of European Operational Research Societies) in PRACE (Partnership for Advanced Computing in Europe).

Več o samem simpoziju na spletnih straneh <http://sor19.fov.uni-mb.si/>.

Tajnik SDI-SOR:



doc. dr. Samo Drobne

Predsednica SDI-SOR:



prof. dr. Lidija Zadnik Stirn