

ISSN: 1848-0225 Print
ISSN: 1848-9931 Online
UDC: 519.8 (063)
Abbreviation: Croat. Oper. Res. Rev.

Publisher:
CROATIAN OPERATIONAL RESEARCH SOCIETY

Co-publishers:
University of Zagreb, Faculty of Economics & Business
J. J. Strossmayer University of Osijek, Faculty of Economics in Osijek
University of Split, Faculty of Economics, Business and Tourism

Croatian Operational Research Review

Volume 11 (2020)
Number 2

Zagreb, 2020

Croatian Operational Research Review is viewed/indexed in: Current Index to Statistics, DOAJ, EBSCO host, EconLit, Genamics Journal Seek, INSPEC, Mathematical Reviews, Current Mathematical Publications (MathSciNet), Proquest, SCOPUS, Web of Science Emerging Sources Citation Index (WoS ESCI), Zentralblatt für Mathematik/Mathematics Abstracts (CompactMath).

ISSN: 1848-0225 Print

ISSN: 1848-9931 Online

UDC: 519.8 (063)

Abbreviation: Croat. Oper. Res. Rev.

Croatian Operational Research Review

Croatian Operational Research Review (CRORR) is an open access scientific journal published bi-annually. The main publisher of the CRORR journal is the Croatian Operational Research Society (CRORS). Starting from 2014, Number 1, co-publishers of the journal are:

- ◇ University of Zagreb, Faculty of Economics & Business,
- ◇ J. J. Strossmayer University of Osijek, Faculty of Economics in Osijek,
- ◇ University of Split, Faculty of Economics, Business and Tourism, and
- ◇ J. J. Strossmayer University of Osijek, Department of Mathematics.

Aims and Scope of the Journal

The aim of the Croatian Operational Research Review journal is to provide high quality scientific papers covering the theory and application of operational research and related areas, mainly quantitative methods and machine learning. The scope of the journal is focused, but not limited to the following areas: combinatorial and discrete optimization, integer programming, linear and nonlinear programming, multiobjective and multicriteria programming, statistics and econometrics, macroeconomics, economic theory, games control theory, stochastic models and optimization, banking, finance, insurance, simulations, information and decision support systems, data envelopment analysis, neural networks and fuzzy systems, and practical OR and application.

Occasionally, special issues are published dedicated to a particular area of OR or containing selected papers from the International Conference on Operational Research.

Papers blindly reviewed and accepted by two independent reviewers are published in this journal.

Publication Ethics and Publication Malpractice Statement

CRORR journal is committed to ensuring ethics in publications and quality of articles. Conformance to standards of ethical behaviour is therefore expected of all parties involved: Authors, Editors, Reviewers, and the Publisher. Before submitting or reviewing a paper read our Publication ethics and Publication Malpractice Statement available at the journal homepage: <http://www.hdoi.hr/crorr-journal>.

The journal is financially supported by the Ministry of Science, Education and Sports of the Republic of Croatia, and by its co-publishers. All data referring to the journal with full papers texts since the beginning of its publication in 2010 can be found in the Hrcak database – Portal of scientific journals of Croatia (see <http://hrcak.srce.hr/crorr>).

Open Access Statement

Croatian Operational Research Review is an open access journal which means that all content is freely available without charge to the user or his/her institution. Users are allowed to read, download, copy, distribute, print, search, or link to the full texts of the articles in the journal without asking prior permission from the publisher or the author. This is in accordance with the BOAI definition of open access. The journal has an open access to full text of all papers through our Open Journal System (<http://hrcak.srce.hr/ojs/index.php/crorr>) and the Hrcak database (<http://hrcak.srce.hr/crorr>).

Croatian Operational Research Review is viewed/indexed by:

- ◇ Current Index to Statistics
- ◇ Directory of Open Access Journals (DOAJ)
- ◇ EBSCO host
- ◇ EconLit
- ◇ Genamics Journal Seek
- ◇ INSPEC
- ◇ Mathematical Reviews, Current Mathematical Publications (MathSciNet)
- ◇ Proquest
- ◇ SCOPUS
- ◇ Web of Science Emerging Sources Citation Index (WoS ESCI)
- ◇ Zentralblatt für Mathematik/Mathematics Abstracts (CompactMath)

Editorial Office and Address:

Editors-in-Chief: Zrinka Lukač
Josip Arnerić

Co-Editors: Anita Čeh Časni
Mirjana Čižmešija
Danijel Grahovac
Goran Lešaja
Snježana Pivac
Blanka Škrabić Perić

Technical Editors: Josip Arnerić
Vedran Kojić

Design: Ivan Ferenčak

Contact:

Croatian Operational Research Society (CROORS), Trg J. F. Kennedyja 6,
HR-10000 Zagreb, Croatia

URL: <http://www.hdoi.hr/crorr-journal>

e-mail: crorr.journal@hdoi.hr

Editorial Board

ZDRAVKA ALJINOVIĆ, Faculty of Economics, Business and Tourism, University of Split, Croatia, e-mail: zdravka.aljinovic@efst.hr

JOSIP ARNERIĆ, Faculty of Economics & Business, University of Zagreb, Croatia, e-mail: jarneric@efzg.hr

MASOUD ASGHARIAN, Department of Mathematics and Statistics, McGill University, Montreal, Quebec, Canada, e-mail: masoud@math.mcgill.ca

ZORAN BABIĆ, Faculty of Economics, Business and Tourism, University of Split, Croatia, e-mail: zoran.babic@efst.hr

VALTER BOLJUNČIĆ, Faculty of Economics and Tourism "Dr. Mijo Mirković", University of Pula, Croatia, e-mail: vbolj@efpu.hr

ĐULA BOROZAN, Faculty of Economics in Osijek, J. J. Strossmayer University of Osijek, Croatia, e-mail: borozan@efos.hr

JAMES COCHRAN, Culverhouse College of Commerce, University of Alabama, USA, e-mail: jcochran@culverhouse.ua.edu

ANITA ČEH ČASNI, Faculty of Economics & Business, University of Zagreb, Croatia, e-mail: aceh@efzg.hr

MIRJANA ČIŽMEŠIJA, Faculty of Economics & Business, University of Zagreb, Croatia, e-mail: mcizmesija@efzg.hr

KSENIJA DUMIČIĆ, Faculty of Economics & Business, University of Zagreb, Croatia, e-mail: kdumicic@efzg.hr

MARGARETA GARDIJAN KEDŽO, Faculty of Economics & Business, University of Zagreb, Croatia, e-mail: mgardijan@efzg.hr

JOSE RUI FIGUEIRA, Instituto Superior Tecnico, Technical University of Lisbon, Portugal, e-mail: figueira@ist.utl.pt

DANIJEL GRAHOVAC, Department of Mathematics, J. J. Strossmayer University of Osijek, Croatia, e-mail: dgrahova@mathos.hr

TIHOMIR HUNJAK, Faculty of Organization and Informatics, University of Zagreb, Croatia, e-mail: tihomir.hunjak@foi.hr

DRAGAN JUKIĆ, Department of Mathematics, J. J. Strossmayer University of Osijek, Croatia, e-mail: jukicd@mathos.hr

VEDRAN KOJIĆ, Faculty of Economics & Business, University of Zagreb, Croatia, e-mail: vkojic@efzg.hr

ULRIKE LEOPOLD-WILDBURGER, Institut für Statistik un Operations Research, Karl-Franzens-Universität Graz, Austria, e-mail: ulrike.leopold@uni-graz.at

GORAN LEŠAJA, Department of Mathematical Sciences, Georgia Southern University, USA, e-mail: goran@georgiasouthern.edu

ZRINKA LUKAČ, Faculty of Economics & Business, University of Zagreb, Croatia, e-mail: zlukac@efzg.hr

ROBERT MANGER, Department of Mathematics, University of Zagreb, Croatia, e-mail: manger@math.hr

JOSIP MESARIĆ, Faculty of Economics in Osijek, J. J. Strossmayer University of Osijek, Croatia, e-mail: mesaric@efos.hr

LUKA NERALIĆ, Faculty of Economics & Business, University of Zagreb, Croatia, e-mail: lneralic@efzg.hr

SNJEŽANA PIVAC, Faculty of Economics, Business and Tourism, University of Split, Croatia, e-mail: spivac@efst.hr

KRUNOSLAV PULJIĆ, Faculty of Economics & Business, University of Zagreb, Croatia, e-mail: kpuljic@efzg.hr

KRISTIAN SABO, Department of Mathematics, J. J. Strossmayer University of Osijek, Croatia, e-mail: ksabo@mathos.hr

RUDOLF SCITOVSKI, Department of Mathematics, J. J. Strossmayer University of Osijek, Croatia, e-mail: scitowsk@mathos.hr

DARKO SKORIN-KAPOV, School of Business, Adelphi University, Garden City, USA, e-mail: skorin@adelphi.edu

JADRANKA SKORIN-KAPOV, W. A. Harriman School for Management and Policy, State University of New York at Stony Brook, USA, e-mail: jskorin@notes.cc.sunysb.edu

PETAR SORIĆ, Faculty of Economics & Business, University of Zagreb, Croatia, e-mail: psoric@efzg.hr

GREYS SOŠIĆ, Information and Operations Management Department, The Marshall School of Business, University of Southern California, Los Angeles, CA, USA, e-mail: sosic@marshall.usc.edu

KENNETH SÖRENSEN, Department of Engineering Management, University of Antwerp, Belgium, e-mail: kenneth.sorensen@uantwerpen.be

ALEMKA ŠEGOTA, Faculty of Economics, University of Rijeka, Croatia, e-mail: alemka.segota@efri.hr

BLANKA ŠKRABIĆ PERIĆ, Faculty of Economics, Business and Tourism, University of Split, Croatia, e-mail: blanka.skrabic@efst.hr

KRISTINA ŠORIĆ, Zagreb School of Economics and Management, Croatia, e-mail: ksoric@zsem.hr

RICHARD WENDELL, Joseph M. Katz Graduate School of Business, University of Pittsburgh, USA, e-mail: wendell@katz.pitt.edu

LIDIJA ZADNIK STIRN, Biotechnical Faculty, University of Ljubljana, Slovenia, e-mail: Lidija.Zadnik@bf.uni-lj.si

SANJO ZLOBEC, Department of Mathematics and Statistics, McGill University, Canada, e-mail:
zlobec@math.mcgill.ca

BERISLAV ŽMUK, Faculty of Economics & Business, University of Zagreb, Croatia, e-mail:
bzmuk@efzg.hr