

ISSN: 2160-8830 Volume 12, Number 2, March 2022



American Journal of Operations Research



ISSN: 2160-8830



<https://www.scirp.org/journal/ajor>

Journal Editorial Board

ISSN 2160-8830 (Print) ISSN 2160-8849 (Online)

<https://www.scirp.org/journal/ajor>

Editor-in-Chief

Prof. Jinfeng Yue

Middle Tennessee State University, USA

Editorial Advisory Board

Prof. Bintong Chen

Prof. Wade D. Cook

Prof. Shu-Cherng Fang

Prof. Panagiotis Kouvelis

Prof. Lawrence M. Seiford

University of Delaware, USA

York University, Canada

North Carolina State University, USA

Washington University in St. Louis, USA

University of Michigan, USA

Editorial Board

Dr. Eman Ahmed Aly Ismail

Dr. Javier De Andrés

Prof. Janine E. Aronson

Dr. Annamaria Barbalgo

Prof. Atac Bascetin

College of International Transport & Logistics, Egypt

University of Oviedo, Spain

University of Georgia, USA

University of Naples “Federico II”, Italy

Mining Engineering Department, Engineering Faculty, Istanbul University

Cerrahpasa, Turkey

NRC Institute for Information Technology, Canada

Wilfrid Laurier University, Canada

University of Electronic Science and Technology of China, China

Department of Computer Science and Artificial Intelligence, University of Granada, Spain

University of Southern Maine, USA

University of Zaragoza, Spain

Southwestern University of Finance and Economics, China

Jadavpur University, India

Cairo University, Egypt

The University of North Carolina at Charlotte, USA

University of Picardie Jules Verne, France

Department of Mathematics and Statistics, University of Windsor, Windsor, Canada

DeGroote School of Business, McMaster University, Canada

Adelphi University, USA

Shanghai Jiao Tong University, China

University of Valladolid, Spain

Thang Long University, Vietnam

RMIT University, Australia

University of Warwick, UK

University of Graz, Austria

Fuzhou University, China

University of Science and Technology of China, China

University of Oviedo, Spain

SidhoKanhoBirsha University, India

School of Business, Wake Forest University, USA

Indira Gandhi National Tribal University, India

Maulana Abul Kalam Azad University of Technology, India

Washington State University, USA

University of Edinburgh, UK

University of Burgos, Spain

The Metropolitan Autonomous University, Mexico

Louisiana State University, USA

IIT Kanpur, India

Wilfrid Laurier University, Canada

Karlsruhe Institute of Technology, Germany

The University of Electro-Communications, Japan

University of Aveiro, Portugal

McMaster University, Canada

Northeastern University, USA

School of Mathematical Sciences, Bohai University, China

University of Idaho, USA

University of Technology of Troyes (UTT), France

Beihang University, China

Southwestern University of Finance and Economics, China

Cairo University, Egypt

University of Wisconsin-Milwaukee, USA

Alibaba Research Center for Complexity Sciences, Hangzhou Normal University, China

Dr. Nabil Belacel

Prof. Ignacio Castillo

Prof. Xu Chen

Dr. Carlos Cruz Corona

Prof. Muhammad El-Taha

Dr. Carmen Galé

Prof. Xianghua Gan

Prof. Bibhas Chandra Giri

Prof. Said Ali Hassan El-Quliti

Prof. Xiuli He

Prof. Mhand Hifi

Prof. Myron Hlynka

Dr. Kai Huang

Prof. Zhimin Huang

Prof. Zhibin Jiang

Dr. Ricardo Josa-Fombellida

Prof. Nguyen Khac Minh

Dr. Santosh Kumar

Prof. Dennis Leech

Prof. Ulrike Leopold-Wildburger

Prof. Dengfeng Li

Prof. Liang Liang

Dr. Pedro Lorca

Prof. Sanat Kumar Mahato

Dr. Patrick R. McMullen

Dr. Vishnu Narayan Mishra

Dr. Sankar Prasad Mondal

Prof. Charles L. Munson

Dr. Jamal Ouenniche

Prof. Joaquín Antonio Pacheco Bonroastro

Prof. Javier Ramirez Rodriguez

Prof. Bhaba R. Sarker

Prof. Renduchintala Raghavendra Kumar Sharma

Dr. Chunming (Victor) Shi

Prof. Andranik Tangian

Prof. Etsuji Tomita

Prof. Delfim F. M. Torres

Dr. Manish Verma

Dr. Yu Amy Xia

Dr. Gongxian Xu

Dr. Shenghan Xu

Prof. Farouk Yalaoui

Dr. Jiping Yang

Dr. Shilei Yang

Prof. Walid Tawfik Younes Mohamed

Dr. Xiaohang Yue

Prof. Zike Zhang

Table of Contents

Volume 12 Number 2

March 2022

**Exploiting Virtual Elasticity of Production Systems to Respect OTD—Part 3: Basic
Considerations for Modelling CPPS Characterized by Non-Ergodic Order Entry and
Non-Deterministic Product-Mix for Fully Flexible Addressable Workstations**

B. G. Rüttimann, M. T. Stöckli.....19

Optimization of a Route Network in Dakar Airspace: Surface Navigation

M. E. Emani, A. Coulibaly, S. G. Diagne, A. O. Haouba, A. N. Mby.....64

American Journal of Operations Research (AJOR)

Journal Information

SUBSCRIPTIONS

The *American Journal of Operations Research* (Online at Scientific Research Publishing, <https://www.scirp.org/>) is published bimonthly by Scientific Research Publishing, Inc., USA.

Subscription rates:

Print: \$79 per issue.

To subscribe, please contact Journals Subscriptions Department, E-mail: sub@scirp.org

SERVICES

Advertisements

Advertisement Sales Department, E-mail: service@scirp.org

Reprints (minimum quantity 100 copies)

Reprints Co-ordinator, Scientific Research Publishing, Inc., USA.

E-mail: sub@scirp.org

COPYRIGHT

Copyright and reuse rights for the front matter of the journal:

Copyright © 2022 by Scientific Research Publishing Inc.

This work is licensed under the Creative Commons Attribution International License (CC BY).

<http://creativecommons.org/licenses/by/4.0/>

Copyright for individual papers of the journal:

Copyright © 2022 by author(s) and Scientific Research Publishing Inc.

Reuse rights for individual papers:

Note: At SCIRP authors can choose between CC BY and CC BY-NC. Please consult each paper for its reuse rights.

Disclaimer of liability

Statements and opinions expressed in the articles and communications are those of the individual contributors and not the statements and opinion of Scientific Research Publishing, Inc. We assume no responsibility or liability for any damage or injury to persons or property arising out of the use of any materials, instructions, methods or ideas contained herein. We expressly disclaim any implied warranties of merchantability or fitness for a particular purpose. If expert assistance is required, the services of a competent professional person should be sought.

PRODUCTION INFORMATION

For manuscripts that have been accepted for publication, please contact:

E-mail: ajor@scirp.org



Call for Papers

American Journal of Operations Research

ISSN 2160-8830 (Print) ISSN 2160-8849 (Online)

<https://www.scirp.org/journal/ajor>

AJOR is an international scientific journal dedicated to the publication and public discussion of high quality, original papers that contribute to the methodology of operational research and to the practice of decision making.

Editor-in-Chief

Prof. Jinfeng Yue

Middle Tennessee State University, USA

Editorial Board

Dr. Eman Ahmed Aly Ismail
Dr. Javier De Andrés
Prof. Janine E. Aronson
Dr. Annamaria Barbagallo
Prof. Atac Bascetin
Dr. Nabil Belacel
Prof. Ignacio Castillo
Prof. Xu Chen
Dr. Carlos Cruz Corona
Prof. Muhammad El-Taha
Dr. Carmen Galé
Prof. Xianghua Gan
Prof. Bibhas Chandra Giri
Prof. Said Ali Hassan El-Quliti
Prof. Xiuli He
Prof. Mhand Hifi
Prof. Myron Hlynka
Dr. Kai Huang

Prof. Zhimin Huang
Prof. Zhibin Jiang
Dr. Ricardo Josa-Fombellida
Prof. Nguyen Khac Minh
Dr. Santosh Kumar
Prof. Dennis Leech
Prof. Ulrike Leopold-Wildburger
Prof. Dengfeng Li
Prof. Liang Liang
Dr. Pedro Lorca
Prof. Sanat Kumar Mahato
Dr. Patrick R. McMullen
Dr. Vishnu Narayan Mishra
Dr. Sankar Prasad Mondal
Prof. Charles L. Munson
Dr. Jamal Ouenniche
Prof. Joaquín Antonio Pacheco Bonrostro
Prof. Javier Ramirez Rodriguez

Prof. Bhaba R. Sarker
Prof. Renduchintala Raghavendra Kumar Sharma
Dr. Chunming (Victor) Shi
Prof. Andranik Tangian
Prof. Etsuji Tomita
Prof. Delfim F. M. Torres
Dr. Manish Verma
Dr. Yu Amy Xia
Dr. Gongxian Xu
Dr. Shenghan Xu
Prof. Farouk Yalaoui
Dr. Jiping Yang
Dr. Shilei Yang
Prof. Walid Tawfik Younes Mohamed
Dr. Xiaohang Yue
Prof. Zike Zhang

Subject Coverage

This journal invites original research and review papers that address the following issues in operations research. Topics of interest include, but are not limited to:

1. Operations Research and Optimization Theory and Research Technical Approaches

Computational Intelligence and Information Management
Continuous Optimization
Decision Support Systems, Multi-Criteria Decision Methods
Discrete Optimization
Expert Systems
Heuristics Mathematical Programming
Networks
Queues
Simulation
Stochastic Models and Statistics
Time Series Analysis

2. Manufacturing and Service Operations Research

Forecasting
Inventory
Location
Logistics, Transportation Warehousing and Maintenance
Planning and Scheduling
Product and Service Design

Project Management
Quality Management
Revenue Management
Supply Chain Management

3. Interfaces with Other Disciplines

Community Operations Research
Complex Systems
Education Operations Research
Environmental and Energy Issues
Financial Engineering
Government Operations Research
Health Services Operations Research
Marketing Science
Military and Homeland Security
Operations Research in Nonprofit Organization
Policy Modeling and Public Sector OR
Productivity and Efficiency in the Public Sector
Sports Operations Research
Telecommunications and Networking

We are also interested in short papers (letters) that clearly address a specific problem, and short survey or position papers that sketch the results or problems on a specific topic. Authors of selected short papers would be invited to write a regular paper on the same topic for future issues of the AJOR.

Notes for Intending Authors

Submitted papers should not have been previously published nor be currently under consideration for publication elsewhere. Paper submission will be handled electronically through the website. All papers are refereed through a peer review process. For more details about the submissions, please access the website.

Website and E-mail

<https://www.scirp.org/journal/ajor>

E-mail: ajor@scirp.org

What is SCIRP?

Scientific Research Publishing (SCIRP) is one of the largest Open Access journal publishers. It is currently publishing more than 200 open access, online, peer-reviewed journals covering a wide range of academic disciplines. SCIRP serves the worldwide academic communities and contributes to the progress and application of science with its publication.

What is Open Access?

All original research papers published by SCIRP are made freely and permanently accessible online immediately upon publication. To be able to provide open access journals, SCIRP defrays operation costs from authors and subscription charges only for its printed version. Open access publishing allows an immediate, worldwide, barrier-free, open access to the full text of research papers, which is in the best interests of the scientific community.

- High visibility for maximum global exposure with open access publishing model
- Rigorous peer review of research papers
- Prompt faster publication with less cost
- Guaranteed targeted, multidisciplinary audience



**Scientific
Research
Publishing**

Website: <https://www.scirp.org>

Subscription: sub@scirp.org

Advertisement: service@scirp.org