

ISSN: 2327-4352 Volume 12, Number 7, July 2024



Scientific
Research
Publishing

Journal of Applied Mathematics and Physics

ISSN: 2327-4352



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

Journal Editorial Board

ISSN 2327-4352 (Print) ISSN 2327-4379 (Online)

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

Editor-in-Chief

Prof. Wen-Xiu Ma

University of South Florida, USA

Editorial Board

Dr. Fatma Özköse

Erciyes University, Türkiye

Prof. Thabet Shuqair Abdeljawad

Prince Sultan University, Saudi Arabia

Prof. Ravi P. Agarwal

Texas A&M University-Kingsville, USA

Dr. Hijaz Ahmad

International Telematic University Uninettuno, Italy

Dr. Izhar Ahmad

King Fahd University of Petroleum and Minerals, Saudi Arabia

Dr. S. Joseph Antony

University of Leeds, UK

Prof. Roberto Oscar Aquilano

Instituto de Física Rosario, Argentina

Dr. Sardar Muhammad Bilal

AIR University, Pakistan

Prof. Chuanjun Chen

Yantai University, China

Prof. Wanyang Dai

Nanjing University, China

Dr. Ahmed Abdel-Moneim El-Deeb

Al-Azhar University, Egypt

Prof. Beih El-Sayed El-Desouky

Mansoura University, Egypt

Prof. D.S. Hooda

GJ University of Science & Tech, India

Prof. Chaudry Masood Khalique

North-West University, South Africa

Dr. Ki Young Kim

Samsung Advanced Institute of Technology, South Korea

Prof. Xiang Li

Beijing University of Chemical Technology, China

Prof. Yang Liu

Qingdao University of Science and Technology, China

Prof. Xing Lv

Beijing Jiaotong University, China

Dr. Jafar Fawzi Mansi AlOmari

Al-Balqa' Applied University, Jordan

Prof. Khaled I. Nawafleh

Mu'tah University, Jordan

Prof. Vasily Novozhilov

Institute for Sustainable Industries & Liveable Cities, Victoria
University, Australia

Prof. Rosa Pardo

Complutense University of Madrid, Spain

Prof. Sanzheng Qiao

McMaster University, Canada

Dr. Daniele Ritelli

University of Bologna, Italy

Dr. Babak Daneshvar Rouyendegh

Atilim University, Türkiye

Prof. Morteza Seddighin

Indiana University East, USA

Dr. Marco Spadini

University of Florence, Italy

Prof. Hari Mohan Srivastava

University of Victoria, Canada

Dr. Yaning Tang

Northwestern Polytechnical University, China

Prof. Ping Wang

Penn State University Schuylkill, USA

Prof. Xiaohui Yuan

Huazhong University of Science and Technology, China

Prof. Nosirjon Yuldashev

Fergana Polytechnic Institute, Uzbekistan

Dr. Abdullahi Yusuf

Biruni University, Türkiye

Table of Contents

Volume 12 Number 7

July 2024

Pseudo-Semi-Overlap Functions-Based Fuzzy Rough Sets Applied to Image Edge Extraction

R. Yin, M. G. Chen, Y. Liu, Y. F. Zhao, J. W. Li 2347

Discussion on the Homology Theory of Lie Algebras

L. L. Kang, Y. Wang, C. Y. Du 2367

Global Dynamics in a Predator-Prey Model with Allee Effect

T. J. Wang, F. Q. Sun 2377

Thermoelectric Stirling Engine (TEG-Stirling Engine) Based on the Analysis of Thermomechanical Dynamics (TMD)

H. Uechi, L. Uechi, S. T. Uechi 2386

Parallelizable Calculation of Observables Values on Analog Quantum Computer

A. Soiguine 2400

Features of Recombination Radiation of GaAs Type Semiconductors with the Participation of Fine Acceptor Levels in a Magnetic Field

N. K. Yuldashev, I. I. Yulchiev, B. J. Akhmadaliev, K. M. Sulaymonov 2407

Special Relativity's "Newtonization" in Complex "Para-Space": The Two Theories Equivalence Question

J. K. Filus 2421

High-Order Soliton Solutions and Hybrid Behavior for the $(2 + 1)$ -Dimensional Konopelchenko-Dubrovsky Equations

X. Y. Li, Y. Ji 2452

Modified Lorentz Transformations and Space-Time Splitting According to the Inverse Relativity Model

M. Girgis 2467

Isometric Immersions of Lightlike Warped Product Manifolds

D. Ndayirukiye, C. Atindogbe, G. Nibaruta 2490

Innovative Technologies for Large-Scale Water Production in Arid Regions: Strategies for Sustainable Development

B. Menin 2506

A Radial Basis Function Method with Improved Accuracy for Fourth Order Boundary Value Problems

S. A. Sarra, D. Musgrave, M. Stone, J. I. Powell 2559

A New Kind of Pre-Mean-Type Mappings and Its Gauss Iteration

Y. J. Ni, Y. L. Fan 2574

A Study on Multivariable Interactions Concerning Radar Cross Section Reduction through Geometric Attributes

E. Sharp 2582

Binding Number and Fractional k -Factors of Graphs

R. Y. Chang 2594

Influence of Waveguide Properties on Wave Prototypes Likely to Accompany the Dynamics of Four-Wave Mixing in Optical Fibers

J. R. Bogning, M. N. Zambo Abou'ou, C. R. Ngouo Tchinda, M. Fomekong, O. L. Ndichia,
S. Mezezem Songna, F. B. Pelap 2601

Changepoint Detection with Outliers Based on RWPCA

X. Zhang, S. Z. Shi, Y. T. Guo 2634

The Strange Relationship between the Momentum of a Photon Emitted from an Electron and the Momentum Acquired by the Electron

K. Suto 2652

Existence of a Sign-Changing Solution Result for Logarithmic Schrödinger Equations with Weight Function

J. X. Huang, J. H. Xie 2665

Split-Tetraquaternion Algebra and Applications

G. L. Panga 2682

A Modified Transitional Korteweg-De Vries Equation: Posed in the Quarter Plane

C. Bu 2691

On the $(\Delta + 2)$ -Total-Colorability of Planar Graphs with 7-Cycles Containing at Most Two Chords

J. Chang, J. R. Liu, F. Zhang 2702

Journal of Applied Mathematics and Physics (JAMP)

Journal Information

SUBSCRIPTIONS

The *Journal of Applied Mathematics and Physics* (Online at Scientific Research Publishing, <https://www.scirp.org/>) is published monthly 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 © 2024 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 © 2024 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.

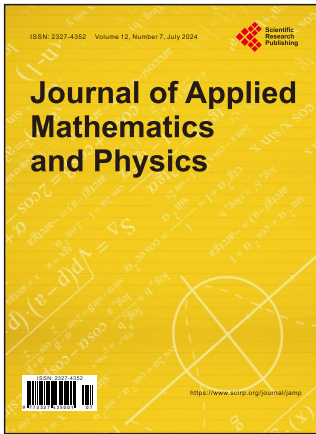
Disclaimer of liability

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: jamp@scirp.org



Journal of Applied Mathematics and Physics

ISSN Print: 2327-4352 ISSN Online: 2327-4379
<https://www.scirp.org/journal/jamp>

Journal of Applied Mathematics and Physics is an international journal dedicated to the latest advancements in applied mathematics and physics. The goal of this journal is to provide a platform for researchers and scientists all over the world to promote, share, and discuss various new issues and developments in different areas of applied mathematics and physics. We aim to publish high quality research articles in terms of originality, depth and relevance of content, and particularly welcome contributions of interdisciplinary research on applied mathematics, physics and engineering.

Subject Coverage

The journal publishes original papers including but not limited to the following fields:

- Applications of Systems
- Applied Mathematics
- Applied Non-Linear Physics
- Applied Optics
- Applied Solid State Physics
- Biophysics
- Computational Physics
- Condensed Matter Physics
- Control Theory
- Cryptography
- Differentiable Dynamical Systems
- Engineering and Industrial Physics
- Experimental Mathematics
- Fluid Mechanics
- Fuzzy Optimization
- Geophysics
- Integrable Systems
- Laser Physics
- Methodological Advances
- Multi-Objective Optimization
- Nanoscale Physics
- Nonlinear Partial Differential Equations
- Non-Linear Physics
- Nuclear Physics
- Numerical Computation
- Optical Physics
- Portfolio Selection
- Riemannian Manifolds
- Scientific Computing
- Set-Valued Analysis
- Soliton Theory
- Space Physics
- Symbolic Computation
- Topological Dynamic Systems
- Variational Inequality
- Vector Optimization

We are also interested in: 1) Short reports—2-5 page papers where an author can either present an idea with theoretical background but has not yet completed the research needed for a complete paper or preliminary data; 2) Book reviews—Comments and critiques.

Notes for Intending Authors

The journal publishes the highest quality original full articles, communications, notes, reviews, special issues and books, covering both the experimental and theoretical aspects including but not limited to the above materials, techniques and studies. Papers are acceptable provided they report important findings, novel insights or useful techniques within the scope of the journal. All manuscript must be prepared in English, and are subjected to a rigorous and fair peer-review process. Generally, accepted papers will appear online within 3 weeks followed by printed hard copy.

Website and E-Mail

<https://www.scirp.org/journal/jamp> E-mail: jamp@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



Website: <https://www.scirp.org>
Subscription: sub@scirp.org
Advertisement: service@scirp.org