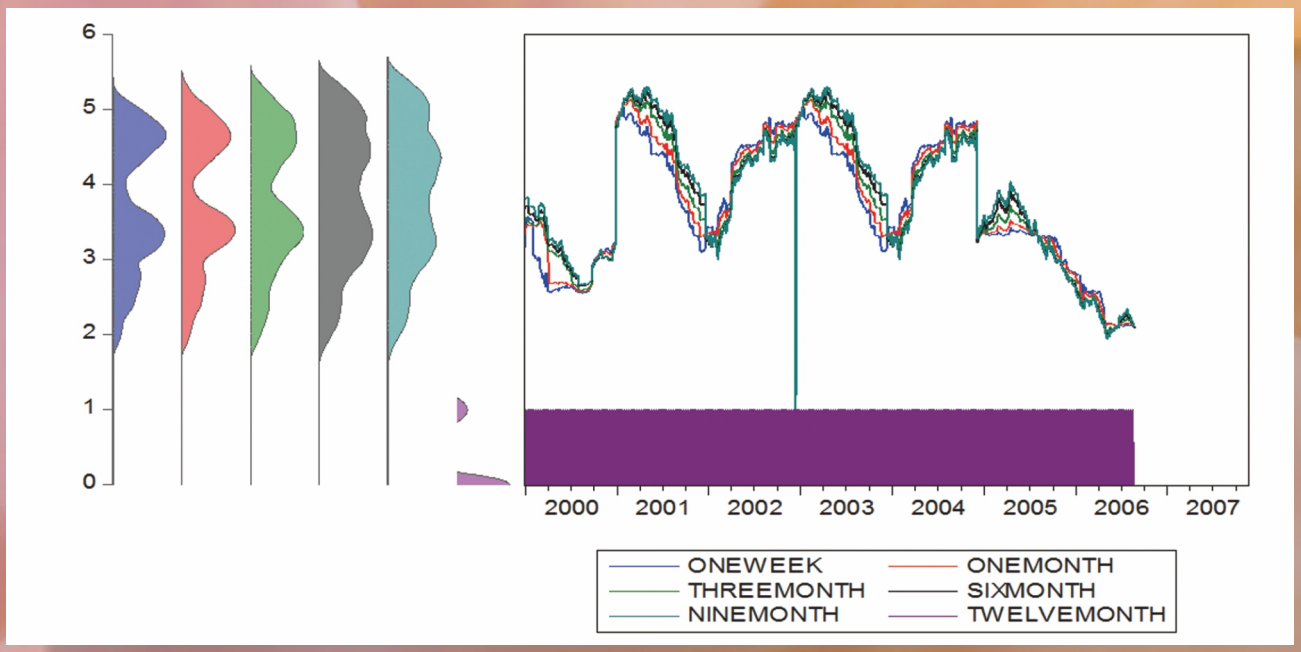
ISSN: 2152-7385 Volume 5, Number 6, April 2014

Scientific Research

# Applied Mathematics




ISSN: 2152-7385

www.scirp.org/journal/am

# Journal Editorial Board

**ISSN Print: 2152-7385 ISSN Online: 2152-7393**

**http://www.scirp.org/journal/am**

## Editor-in-Chief

| | |
|---|---|
| **Prof. Chris Cannings** | University of Sheffield, UK |

## Editorial Board

| | |
|---|---|
| **Prof. Tamer Başar** | University of Illinois at Urbana-Champaign, USA |
| **Prof. Leva A. Beklaryan** | Russian Academy of Sciences, Russia |
| **Dr. Aziz Belmiloudi** | Institut National des Sciences Appliquees de Rennes, France |
| **Dr. Anjan Biswas** | Delaware State University, USA |
| **Prof. Mark Broom** | City University, UK |
| **Prof. Amares Chattopadhyay** | Indian School of Mines, India |
| **Prof. Badong Chen** | Xi'an Jiaotong University, China |
| **Prof. Ljubomir Ciric** | University of Belgrade, Serbia |
| **Prof. Jose Alberto Cuminato** | University of Sao Paulo, Spain |
| **Prof. Konstantin Dyakonov** | University of Barcelona , Spain |
| **Prof. Anwar H. Joarder** | King Fahd University of Petroleum and Minerals, Saudi Arabia |
| **Prof. Palle Jorgensen** | University of Iowa, USA |
| **Dr. Vladimir A. Kuznetsov** | Bioinformatics Institute, Singapore |
| **Prof. Kil Hyun Kwon** | Korea Advanced Institute of Science and Technology, South Korea |
| **Dr. Hong-Jian Lai** | West Virginia University, USA |
| **Dr. Goran Lesaja** | Georgia Southern University, USA |
| **Prof. Tao Luo** | Georgetown University, USA |
| **Prof. Addolorata Marasco** | University of Naples Federico II, Italy |
| **Prof. María A. Navascués** | University of Zaragoza, Spain |
| **Dr. Donatus C. D. Oguamanam** | Ryerson University, Canada |
| **Prof. Alexander S. Rabinowitch** | Moscow State University, Russia |
| **Prof. Yuriy V. Rogovchenko** | University of Agder, Norway |
| **Dr. Epaminondas Sidiropoulos** | Aristotle University of Thessaloniki, Greece |
| **Prof. Sergei Silvestrov** | Mälardalen University, Sweden |
| **Prof. Hari M. Srivastava** | University of Victoria, Canada |
| **Prof. Jacob Sturm** | Rutgers University, USA |
| **Prof. Mikhail Sumin** | Nizhnii Novgorod State University, Russia |

**Applied Mathematics, 2014, 5, 843-1045**
Published Online April 2014 in SciRes. http://www.scirp.org/journal/am

Scientific Research

# Table of Contents

**Volume 5 Number 6 April 2014**

**Dynamics Behaviors of a Reaction-Diffusion Predator-Prey System with Beddington-DeAngelis Functional Response and Delay**

P. Du, C. X. Duan, X.. Y. Liao.....843

**Application of the Homotopy Perturbation Method to Nonlinear Heat Conduction and Fractional Van der Pol Damped Nonlinear Oscillator**

T. A. Nofel.....852

**An Application of Bayesian Inference on the Modeling and Estimation of Operational Risk Using Banking Loss Data**

K. N. Rahman, D. A. Black, G. C. McDonald.....862

**Mathematical Modeling and Analysis of Torsional Surface Waves in a Transverse Isotropic Elastic Solid Semi-Infinite Medium with Varying Rigidity and Density under a Rigid Layer**

A. P. Ghorai, R. Tiwary.....877

**Linear Programming for Optimum PID Controller Tuning**

E. J. Oliveira, L. M. Honorio, A. H. Anzai, T. X. Soares.....886

**The Probability Distribution of the Elastic Properties of Pure Metals**

C. Steele.....898

**Paraconsistent Differential Calculus (Part I): First-Order Paraconsistent Derivative**

J. I. Da Silva Filho.....904

**Some Remarks on the Non-Abelian Fourier Transform in Crossover Designs in Clinical Trials**

P. Zizler.....917

**Parameter Dependence in Stochastic Modeling—Multivariate Distributions**

J. K. Filus, L. Z. Filus.....928

**On Links between Rough Sets and Digital Topology**

E.-S. A. Abo-Tabl.....941

**An Introduction to Paraconsistent Integral Differential Calculus: With Application Examples**

J. I. Da Silva Filho.....949

**Statistically Dual Distributions and Estimation**

S. Bityukov, N. Krasnikov, S. Nadarajah, V. Smirnova.....963

**Applied Mathematics, 2014, 5, 843-1045**
Published Online April 2014 in SciRes. http://www.scirp.org/journal/am

**New Applications to Solitary Wave Ansatz**

M. Younis, S. Ali.....969

**Influential Observations in Stochastic Model of Divisia Index Numbers with AR(1) Errors**

S. M. A. Burney, A. Maqsood.....975

**Anti-Robinson Structures for Analyzing Three-Way Two-Mode Proximity Data**

H.-F. Köhn.....983

**Some Fixed Point Results of Ciric-Type Contraction Mappings on Ordered *G*-Partial Metric Spaces**

J. O. Olaleru, K. S. Eke, H. O. Olaoluwa.....1004

**An Alternative Manifold for Cosmology Using Seifert Fibered and Hyperbolic Spaces**

M. E. Mejía, R. R. Rosa.....1013

**The Effectiveness of the ECB Announcement Channel**

A. Hachicha, A. Masmoudi.....1029

The figure on the front cover is from the article published in Applied Mathematics, 2014, Vol. 5, No. 6, pp. 1029-1045 by Ahmed Hachicha and Afif Masmoudi.

# Applied Mathematics (AM)

# Journal Information

## SUBSCRIPTIONS

The *Applied Mathematics* (Online at Scientific Research Publishing, www.SciRP.org) is published monthly by Scientific Research Publishing, Inc., USA.

### Subscription rates:

Print: $89 per copy.
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 © 2014 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 © 2014 by author(s) and Scientific Research Publishing Inc.

**REUSE RIGHTS FOR INDIVIDUAL PAPERS:**

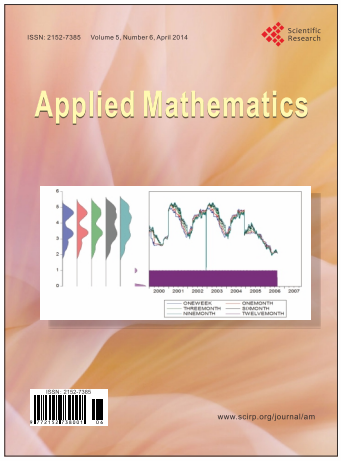
Note: At SCIRP authors can choose between CC BY and CC BY-NC. Please consult each paper for its reuse rights.

**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: am@scirp.org




**Call for Papers**

# Applied Mathematics (AM)

ISSN Print: 2152-7385 ISSN Online: 2152-7393
http://www.scirp.org/journal/am

***Applied Mathematics*** **(AM)** is an international journal dedicated to the latest advancement of applied mathematics. The goal of this journal is to provide a platform for scientists and academicians all over the world to promote, share, and discuss various new issues and developments in different areas of applied mathematics.

## Subject Coverage

All manuscripts must be prepared in English, and are subject to a rigorous and fair peer-review process. Accepted papers will immediately appear online followed by printed hard copy. The journal publishes original papers including but not limited to the following fields:

- Applied Probability
- Applied Statistics
- Approximation Theory
- Chaos Theory
- Combinatorics
- Complexity Theory
- Computability Theory
- Computational Methods in Mechanics and Physics
- Continuum Mechanics
- Control Theory
- Cryptography
- Discrete Geometry
- Dynamical Systems
- Elastodynamics
- Evolutionary Computation
- Financial Mathematics
- Fuzzy Logic
- Game Theory
- Graph Theory
- Information Theory
- Inverse Problems
- Linear Programming
- Mathematical Biology
- Mathematical Chemistry
- Mathematical Economics
- Mathematical Physics
- Mathematical Psychology
- Mathematical Sociology
- Matrix Computations
- Neural Networks
- Nonlinear Processes in Physics
- Numerical Analysis
- Operations Research
- Optimal Control
- Optimization
- Ordinary Differential Equations
- Partial Differential Equations
- Probability Theory
- Statistical Finance
- Stochastic Processes
- Theoretical Statistics

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

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

**http://www.scirp.org/journal/am** **E-mail: am@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, by delivering superior scientific publications and scientific information solution provider that enable advancement in scientific research.

## *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, world-wide, 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

**Website: http://www.scirp.org**

**Subscription: sub@scirp.org**

**Advertisement: service@scirp.org**