

Computational Mathematics and Computer Modeling with Applications (CMCMA)

Volume 1, Issue 2, 2022

# **Director-in-Charge**

# **Kourosh Parand**

Department of Computer and Data Sciences, Shahid Beheshti University, Tehran, Iran

# **Editor-in-Chief**

# **Masoud Hajarian**

Department of Applied Mathematics, Shahid Beheshti University, Tehran, Iran Email: cmcma@sbu.ac.ir; m\_hajarian@sbu.ac.ir

# **Senior Editor**

**Biswa Nath Datta** Department of Mathematical Sciences, Northern Illinois University, DeKalb, Illinois, USA

# **Ravi P Agarwal**

Department of Mathematics, Texas A&M University-Kingvsille, Kingsville, TX 7836, USA

# Ioannis Konstantinos Argyros

Department of Mathematical Sciences, Cameron University, Lawton, Oklahoma, USA

# Hari Mohan Srivastava

Department of Mathematics and Statistics, University of Victoria, Victoria, British Columbia, Canada

# Junzo Watada

Graduate School of Information, Production and Systems, Waseda University, Kitakyushu, 808-0135, Japan

# Ernesto G. Birgin

Department of Computer Science, Institute of Mathematics and Statistics, University of São Paulo, Brazil

# Silvestru Sever Dragomir

Mathematics, College of Engineering & Science, Victoria University, Melbourne, Australia and

DST-NRF Centre of Excellence in the Mathematical and Statistical Sciences, School of Computer Science & Applied Mathematics, University of the Witwatersrand, Johannesburg, South Africa

# Ke Chen

Department of Mathematical Sciences, University of Liverpool, Liverpool, UK

# **Lothar Reichel**

Department of Mathematical Sciences, Kent State University, Kent, USA

# Dumitru Baleanu

Institute of Space Sciences, P.O. Box, MG-23, R76900, Magurele-Bucharest, Romania and

Department of Mathematics, Faculty of Arts and Sciences, Cankaya University, 06530 Ankara, Turkey

# **Associate Editor**

# Mehdi Dehghan

Department of Applied Mathematics, Amirkabir University of Technology, Tehran, Iran

## Jacob D. Biamonte

Skolkovo Institute of Science and Technology, Moscow, Russian Federation Head of Skoltech's Laboratory for Quantum Information Processing Center for Artificial Intelligence Technologies (CAIT)

# Jin-Ting Zhang

Department of Statistics and Data Science, National University of Singapore, Singapore

**Changbum Chun** Department of Mathematics, Sungkyunkwan University, Suwon 16419, Republic of Korea

## Mohsen Razzaghi

Department of Mathematics and Statistics, Mississippi State University, Mississippi State, USA

## Fiorella Sgallari

Department of Mathematics, University of Bologna, Bologna, Italy

## Vasile Lupulescu

University Constantin Brâncusi, Republicii 1, 210136, Târgu-Jiu, Romania

## **Ninoslav Truhar**

Department of Mathematics, Josip Juraj Strossmayer University of Osijek, Trg Ljudevita Gaja 6 Osijek, Croatia

## **Denis Sidorov**

Industrial Mathematics Laboratory, Baikal School of BRICS, Irkutsk National Research Technical University, Irkutsk, Russian Federation and

Applied Mathematics Department, Energy Systems Institute, Siberian Branch of Russian Academy of Sciences, Irkutsk, Russian Federation

# Jen-Chih Yao

Department of Applied Mathematics, National Sun Yat-sen University, Kaohsiung, Taiwan and

Research Center for Interneural Computing, China Medical University Hospital, China Medical University, Taichung, Taiwan

# Frank Werner

Faculty of Mathematics, Otto-von-Guericke University, Magdeburg, Germany

# **Alexander Zeifman**

Vologda State University, Russia

# **Clemente Cesarano**

Section of Mathematics, International Telematic University Uninettuno, CorsoVittorio Emanuele II, 39, 00186 Roma, Italy

# **Ioannis Dassios**

School of Electrical and Electronic Engineering, University College Dublin, Ireland

# Ali A. Afzalian

Department of Electrical Engineering, Abbaspour School of Engineering, Shahid Beheshti University, Tehran, Iran

# Janez Žerovnik

Institute of Mathematics, Physics and Mechanics, Ljubljana, Slovenia and Faculty of Mechanical Engineering, University of Ljubljana, Ljubljana, Slovenia

# **Hassane Abbas**

Department of Mathematics, Faculty of Sciences-1 Lebanese University, Beirut, Lebanon

# Hua Dai

Department of Mathematics, Nanjing University of Aeronautics and Astronautics, Nanjing, China

# Hamid Reza Karimi

Department of Mechanical Engineering, Politecnico di Milano, Milan, Italy Member Academia Europa, Distinguished Fellow IIAV, Fellow ISCM

# Yimin Wei

School of Mathematical Sciences and Shanghai Key Laboratory of Contemporary Applied Mathematics, Fudan University, Shanghai, PR China

# Mehiddin Al-Baali

Department of Mathematics and Statistics, Sultan Qaboos University, Muscat, Oman

# Yadollah Ordokhani

Department of Mathematics, Alzahra University, Tehran, Iran

# Juan R. Torregrosa

Mutidisciplinary Mathematical Institute, Universitat Politècnica de València, Valencia, Spain

# Jin Yun Yuan

Dongguan University of Technology, China and Federal University of Paraná, Brazil

# Sohrabali Yousefi

Department of Applied Mathematics, Shahid Beheshti University, Tehran, Iran

# Abbas Saadatmandi

Department of Applied Mathematics, Faculty of Mathematical Sciences, University of Kashan, Kashan, Iran

## **Predrag Stanimirović**

Faculty of Sciences and Mathematics, University of Nis, Nis, Serbia

# Ivan I. Kyrchei

Pidstryhach Institute for Applied Problems of Mechanics and Mathematics of NAS of Ukraine, L'viv, Ukraine

# **Aims and Scope**

Computational Mathematics and Computer Modeling with Applications is an international journal published by Shahid Beheshti University, Tehran, Iran, free of page charges. The purpose of the journal is to provide a forum for the publication of high quality research and tutorial papers in modelling, applied and computational mathematics.

The following are the principal areas of interest of the journal:

- Tensor computations and applications
- Numerical linear algebra
- Application of methods of numerical linear algebra in science, engineering and economics
- Machine learning
- Numerical optimization
- Computational statistics
- Control systems
- Iterative methods for nonlinear equations
- Fast numerical algorithms
- Parallel computations
- Numerical solutions of PDEs
- Theory and computations of non-local modelling and fractional partial differential equations
- Imaging algorithms, deep neural network configurations and vision restorations
- Stochastic partial differential equations
- Computational finance and applications
- Computational medicine, biomedicine and epidemiology
- Inverse problems and data analysis
- Modeling using PDEs
- Analysis of mathematical models, formulated in terms of PDEs
- Discretization methods and numerical analysis for PDEs
- Verification and validation
- Interpolation and approximation
- Integral equations

# **Guide for Authors**

**Submission**: Your manuscripts should be written in Good English and using LaTeX. By submitting, the authors confirm that their articles have been **neither published nor submitted for publication** elsewhere.

Submissions should be sent online in the web site: https://cmcma.sbu.ac.ir/ and by emailing the PDF file of your manuscripts to the Director-in-Charge (**Masoud Hajarian**) at: cmcma@sbu.ac.ir.

**LaTeX:** A **LaTeX template** is available for this journal. Please save the LaTeX template to your hard drive and open it. You are recommended to use LaTeX template to prepare your manuscript and **BibTeX** to generate your bibliography.

#### Refereeing process: Our review process type is the single-blind peer review.

After the **Director-in-Charge** approves that a submitted paper meets the aims and scope of the journal, it will be sent to one or two experts, advised by the **Editorial Board**, to review it. The refereeing should be completed in three months, unless the paper is longer than 15 pages.

Based on the referee's report, the Editorial Board decides on the paper as:

(1) The paper is accepted without changes, (2) The paper is accepted subject to minor changes, in which case the revised version should be sent back to the journal in at most one month, (3) The paper will be accepted subject to more substantial changes being made, in which case the revised version should be sent back to the journal in at most two months, (4) The paper might be acceptable but requires major revisions, in which case the paper will be regarded as withdrawn and any new version will be regarded as a new submission, (5) The paper is rejected.

Accepted articles: If a paper is accepted, the corresponding author will be required to provide the original TeX files of it, without changes, using the style of the journal given in the link (cmcma.tex and cmcma.cls). Please ensure the references are produced in the same style as the sample article.

**Copyright:** The authors of the accepted papers, by sending the final original files of theirs articles, agree that the copyright of their articles are transferred to this journal. Also, they should notice that we follow the CC BY creative commons copyright license.

# Contents

A hybrid method of successive linearization method (SLM) and collocation method to steady regime of the reaction-diffusion equation

Pages 1-7

10.52547/CMCMA.1.2.1

Elyas Shivanian; Eghbal Mohammadi

An efficient iterative method for finding the Moore-Penrose and Drazin inverse of a matrix

Pages 8-19

10.52547/CMCMA.1.2.8

Raziyeh Erfanifar

A class of efficient derivative free iterative method with and without memory for solving nonlinear equations

Pages 20-26

10.52547/CMCMA.1.2.20

Raziyeh Erfanifar

#### Reproducing kernel method for Abel's second kind singular integral equations

Pages 27-34

10.52547/CMCMA.1.2.27

Nazi Abdollahi; Saeid Abbasbandy

Newton-Krylov generalized minimal residual algorithm in solving the nonlinear two-dimensional integral equations of the second kind on non-rectangular domains with an error estimate

Pages 35-45

10.52547/CMCMA.1.2.35

Hafez Yari; Mehdi Delkhosh

Numerical investigation of differential biological models via Gaussian RBF collocation method with genetic strategy

Pages 46-64

10.52547/CMCMA.1.2.46

Fardin Salehi; Soleiman Hashemi Shahraki; Mohammad Kazem Fallah; Mohammad Hemami

#### A computational method to solve fractional-order Fokker-Planck equations based on Touchard polynomials

Pages 65-73

10.52547/CMCMA.1.2.65

Sedigheh Sabermahani; Yadollah Ordokhani

#### A new approach for solving nonlinear equations

Pages 74-85

10.52547/CMCMA.1.2.74

Marzieh Dehghani-Madiseh

# On two convex variational models and their iterative solutions for selective segmentation of images with intensity inhomogeneity

Pages 86-103

10.52547/CMCMA.1.2.86

Liam Burrowsa; Ke Chen; Francesco Torella

# Numerical solution for solving magnetohydrodynamic (MHD) flow of nanofluid by least squares support vector regression

Pages 104-121

10.52547/CMCMA.1.2.104

Aida Pakniyat

# On modified decomposition of interval matrices and its application

Pages 122-128

10.52547/CMCMA.1.2.122

Marzieh Dehghani-Madiseh

# A hybrid numerical method based on the generalized pseudospectral method for solving nonlinear differential equations

Pages 129-138

10.52547/CMCMA.1.2.12

Mehdi Delkhosh; Reza Arefi Shirvan