

**Applied Mathematics,
Computational Science
and Engineering**

**Proceedings of the 2014 International Conference on
Applied Mathematics, Computational Science & Engineering
(AMCSE 2014)**

**Varna, Bulgaria
September 13-15, 2014**

Edited by

Valeri Mladenov
Imre Rudas
Olga Martin
Georgi Tsenov
Panos M. Pardalos
Martin Hromada

APPLIED MATHEMATICS, COMPUTATIONAL SCIENCE and ENGINEERING

**Proceedings of the 2014 International Conference on Applied
Mathematics, Computational Science & Engineering (AMCSE 2014)**

**Varna, Bulgaria
September 13-15, 2014**

APPLIED MATHEMATICS, COMPUTATIONAL SCIENCE and ENGINEERING

**Proceedings of the 2014 International Conference on Applied
Mathematics, Computational Science & Engineering (AMCSE 2014)**

**Varna, Bulgaria
September 13-15, 2014**

Copyright © 2014, by the editors

All the copyright of the present book belongs to the editors. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of the editors.

All papers of the present volume were peer reviewed by no less than two independent reviewers. Acceptance was granted when both reviewers' recommendations were positive.

Series: Mathematics and Computers in Science and Engineering Series | 30

ISBN: 978-1-61804-246-0

ISSN: 2227-4588

APPLIED MATHEMATICS, COMPUTATIONAL SCIENCE and ENGINEERING

**Proceedings of the 2014 International Conference on Applied
Mathematics, Computational Science & Engineering (AMCSE 2014)**

**Varna, Bulgaria
September 13-15, 2014**

Organizing Committee

Editors:

Prof. Valeri Mladenov, Technical University of Sofia, Bulgaria
Prof. Imre Rudas, Obuda University, Budapest, Hungary
Prof. Olga Martin, Politehnica University of Bucharest, Romania
Prof. Georgi Tsenov, Technical University of Sofia, Bulgaria
Prof. Panos M. Pardalos, University of Florida, USA
Prof. Martin Hromada, Tomas Bata University in Zlín, Czech Republic

Program Committee:

Prof. Martin Bohner, Missouri University of Science and Technology, USA
Prof. Dashan Fan, University of Wisconsin-Milwaukee, Milwaukee, WI, USA
Prof. Luis Castro, University of Aveiro, Aveiro, Portugal
Prof. Metin Demiralp, Istanbul Technical University, Istanbul, Turkey
Prof. Kamisetty Rao, IEEE Fellow, Univ. of Texas at Arlington, USA
Prof. Alberto Fiorenza, Universita' di Napoli "Federico II", Napoli (Naples), Italy
Prof. Patricia J. Y. Wong, Nanyang Technological University, Singapore
Prof. Salvatore A. Marano, Universita degli Studi di Catania, Catania, Italy
Prof. Martin Schechter, University of California, Irvine, USA
Prof. Ivan G. Avramidi, New Mexico Tech, Socorro, New Mexico, USA
Prof. Michel Chipot, University of Zurich, Zurich, Switzerland
Prof. Narsingh Deo, IEEE Fellow, ACM Fellow, University of Central Florida, USA
Prof. Xiaodong Yan, University of Connecticut, Connecticut USA
Prof. Ravi P. Agarwal, Texas A&M University - Kingsville, Kingsville, TX, USA
Prof. Yushun Wang, Nanjing Normal university, Nanjing, China
Prof. Dimitri Bertsekas, IEEE Fellow, MIT, USA
Prof. Ferhan M. Atici, Western Kentucky University, Bowling Green, KY 42101, USA
Prof. Anastassios Venetsanopoulos, IEEE Fellow, University of Toronto, Canada
Prof. Ravi P. Agarwal, Texas A&M University - Kingsville, Kingsville, TX, USA
Prof. Feliz Minhós, Universidade de Evora, Evora, Portugal
Prof. Mihai Mihailescu, University of Craiova, Craiova, Romania
Prof. Aggelos Katsaggelos, IEEE Fellow, Northwestern University, USA
Prof. Abraham Bers, IEEE Fellow, MIT, USA
Prof. Lucas Jodar, Universitat Politècnica de Valencia, Valencia, Spain
Prof. Jim Zhu, Western Michigan University, Kalamazoo, MI, USA
Prof. Andrei Korobeinikov, Centre de Recerca Matematica, Barcelona, Spain
Prof. Josef Diblík, Brno University of Technology, Brno, Czech Republic
Prof. Jianqing Chen, Fujian Normal University, Fuzhou, Fujian, China
Prof. Naseer Shahzad, King Abdulaziz University, Jeddah, Saudi Arabia
Prof. Sining Zheng, Dalian University of Technology, Dalian, China
Prof. Leszek Gasinski, Uniwersytet Jagielloński, Krakow, Poland
Prof. Satit Saejung, Khon Kaen University, Muang District, Khon Kaen, Thailand
Prof. Ferhan M. Atici, Department of Mathematics, Western Kentucky University, USA
Prof. Meirong Zhang, Tsinghua University, Beijing, China
Prof. Lucio Boccardo, Universita degli Studi di Roma "La Sapienza", Roma, Italy
Prof. Tiecheng Xia, Department of Mathematics, Shanghai University, China
Prof. Lucas Jodar, Universitat Politècnica de Valencia, Valencia, Spain
Prof. Noemi Wolanski, Universidad de Buenos Aires, Buenos Aires, Argentina
Prof. Zhenya Yan, Chinese Academy of Sciences, Beijing, China
Prof. Shanhe Wu, Longyan University, Longyan, Fujian, China
Prof. Natig M. Atakishiyev, National Autonomous University of Mexico, Mexico
Prof. Jianming Zhan, Hubei University for Nationalities, Enshi, Hubei Province, China
Prof. Narcisa C. Apreutesei, Technical University of Iasi, Iasi, Romania
Prof. Detlev Buchholz, Universitaet Goettingen, Goettingen, Germany

Prof. Patricia J. Y. Wong, Nanyang Technological University, Singapore
Prof. Juan J. Trujillo, Universidad de La Laguna, La Laguna, Tenerife, Spain
Prof. Juan Carlos Cortes Lopez, Universidad Politecnica de Valencia, Spain
Prof. Wei-Shih Du, National Kaohsiung Normal University, Kaohsiung City, Taiwan
Prof. Chun-Gang Zhu, Dalian University of Technology, Dalian, China
Prof. Abdelghani Bellouquid, University Cadi Ayyad, Morocco
Prof. Jinde Cao, Southeast University/ King Abdulaziz University, China
Prof. Dumitru Baleanu, Cankaya University, Ankara, Turkey
Prof. Kailash C. Patidar, University of the Western Cape, Cape Town, South Africa

Additional Reviewers

Matthias Buyle	Artesis Hogeschool Antwerpen, Belgium
Lesley Farmer	California State University Long Beach, CA, USA
Deolinda Rasteiro	Coimbra Institute of Engineering, Portugal
Sorinel Oprisan	College of Charleston, CA, USA
Santoso Wibowo	CQ University, Australia
Yamagishi Hiromitsu	Ehime University, Japan
Kei Eguchi	Fukuoka Institute of Technology, Japan
Shinji Osada	Gifu University School of Medicine, Japan
Tetsuya Yoshida	Hokkaido University, Japan
Xiang Bai	Huazhong University of Science and Technology, China
Philippe Dondon	Institut polytechnique de Bordeaux, France
José Carlos Metrôlho	Instituto Politecnico de Castelo Branco, Portugal
João Bastos	Instituto Superior de Engenharia do Porto, Portugal
Takuya Yamano	Kanagawa University, Japan
Hessam Ghasemnejad	Kingston University London, UK
Konstantin Volkov	Kingston University London, UK
Eleazar Jimenez Serrano	Kyushu University, Japan
Jon Burley	Michigan State University, MI, USA
Manoj K. Jha	Morgan State University in Baltimore, USA
Frederic Kuznik	National Institute of Applied Sciences, Lyon, France
Stavros Ponis	National Technical University of Athens, Greece
Ole Christian Boe	Norwegian Military Academy, Norway
Imre Rudas	Obuda University, Budapest, Hungary
Masaji Tanaka	Okayama University of Science, Japan
Francesco Rotondo	Polytechnic of Bari University, Italy
George Barreto	Pontificia Universidad Javeriana, Colombia
Dmitrijs Serdjuks	Riga Technical University, Latvia
Andrey Dmitriev	Russian Academy of Sciences, Russia
Tetsuya Shimamura	Saitama University, Japan
Francesco Zirilli	Sapienza Universita di Roma, Italy
Minhui Yan	Shanghai Maritime University, China
Valeri Mladenov	Technical University of Sofia, Bulgaria
Jose Flores	The University of South Dakota, SD, USA
James Vance	The University of Virginia's College at Wise, VA, USA
Genqi Xu	Tianjin University, China
Zhong-Jie Han	Tianjin University, China
Kazuhiko Natori	Toho University, Japan
Moran Wang	Tsinghua University, China
M. Javed Khan	Tuskegee University, AL, USA
Bazil Taha Ahmed	Universidad Autonoma de Madrid, Spain
Alejandro Fuentes-Penna	Universidad Autónoma del Estado de Hidalgo, Mexico
Miguel Carriegos	Universidad de Leon, Spain
Angel F. Tenorio	Universidad Pablo de Olavide, Spain
Abelha Antonio	Universidade do Minho, Portugal

Table of Contents

<u>Erosion Case Study by Computational Fluid Dynamics (CFD) Modeling and Optimization in Situ of Clinker Sampler Probe Design</u>	13
<i>Héctor Alfredo López Aguilar, Jorge Alberto Gómez, Marco Antonio Merino, Alberto Duarte Möller, E. Orrantia-Borunda, Antonino Pérez Hernández</i>	
<u>Electrical Brackets for IP Cameras</u>	25
<i>Milan Adamek, Dora Lapkova, Rudolf Chovanec, Petr Neumann, Miroslav Matysek</i>	
<u>Communication Principles Between Client and Physical Hardware of ISES Remote Laboratory</u>	33
<i>M. Gerža, F. Schauer, K. Vlček</i>	
<u>Electromagnetic Compatibility of Alarm Systems</u>	47
<i>Jan Valouch</i>	
<u>Optosensors Systems in Spherical Safety Protection Security Systems</u>	56
<i>Ján Ivanka, Petr Navrátil</i>	
<u>Safety Analysis as a Basis for Safety Planning</u>	61
<i>Vladislav Stefka</i>	
<u>Setting a Method of Determination of “Fire for Effect” Firing Data</u>	72
<i>Martin Blaha, Ladislav Potužák, Milan Kalina</i>	
<u>Determination of the Kinetic Model for Cell Line on the Duration of Action of an Inhibitor of Tyrosine Kinases Receptors</u>	82
<i>Corina Brîndușa, Cornelia Aida Bulucea, Nikos E. Mastorakis</i>	
<u>Software Support of Integration of Alarm Systems</u>	92
<i>Jan Valouch</i>	
<u>The Elevation of Positional Mechanisms for the Measurement of Electromagnetic Fields on Cylindrical Surfaces</u>	99
<i>Ján Ivanka, Petr Navrátil</i>	
<u>Categorization of ITIL® Tools</u>	104
<i>Lukas Kralik, Ludek Lukas</i>	
<u>Proposal of Workplace for Testing of Electromagnetic Susceptibility – Electrical Fast Transient/Burst</u>	111
<i>Hana Urbancokova, Jan Valouch, Milan Adamek, Michal Nagy</i>	
<u>Safety of Database Storage for Remote Laboratories and Laboratory Management System</u>	119
<i>L. Pálka, F. Schauer, R. Jašek</i>	

<u>Design of a Software Tool for Mobile Application User Mental Models Collection and Visualization</u>	133
<i>Radek Vala, Roman Jasek, David Malanik</i>	
<u>Proposal of Evaluation ITIL® Tools</u>	142
<i>Lukas Kralik, Ludek Lukas</i>	
<u>Analysis of Direct Punch with a View to Velocity</u>	147
<i>Dora Lapkova, Milan Adamek</i>	
<u>Modernization of Artillery Reconnaissance</u>	156
<i>Jiří Šotnar, Michal Carbol, Martin Blaha</i>	
<u>A Recommender System using Collaborative Filtering and K Mean Based on Android Application</u>	161
<i>Kunyanuth Kularbphettong, Sunisa Somngam, Cholticha Tongsiri, Pattarapan Roonrakwit</i>	
<u>Local Flood Warning Systems and Application Possibilities</u>	167
<i>Jakub Rak, David Sevcik, Blanka Svobodova, Jan Strohmandl</i>	
<u>Service Design According ITIL® with RAD Approach</u>	175
<i>Veronika Vesela, Lukas Kralik</i>	
<u>Software Application of Mathematical Modeling of Critical Infrastructure Element Resilience</u>	180
<i>Martin Hromada, Ludek Lukas</i>	
<u>Testing the Security in Analog Intrusion And Hold-up Alarm Systems</u>	194
<i>Adam Hanáček, Martin Sysel</i>	
<u>Security Risks of Java Applets in Remote Experimentation and Available Alternatives</u>	201
<i>Petra Špiláková, Roman Jašek, František Schauer</i>	
<u>Laboratory Robotic Systems for the Security Industry</u>	213
<i>Petr Navrátil, Ján Ivanka</i>	
<u>A Proposal of Camera System for Measuring of EMC Parameters of Information Technology Equipment</u>	221
<i>Michal Nagy, Jan Valouch, Hana Urbancokova</i>	
<u>Lighting Measurement Methods related to Intelligent Video Surveillance System Evaluation</u>	231
<i>Jiri Sevcik, Petr Svoboda</i>	
<u>University Network with REMLABNET and Communication among Individual Datacenters</u>	240
<i>P. Beňo, F. Schauer, K. Vlček</i>	

<u>Safety Research of Population Protection According to Population Differentiation</u>	251
<i>Lenka Brehovská, Libor Líbal, Zuzana Freitinger Skalická</i>	
<u>Usability CAN Bus for Encrypted Communication InIntrusion and Hold-up Alarm Systems</u>	257
<i>Adam Hanáček, Martin Sysel</i>	
<u>On Different Approaches to Human Body Movement Analysis</u>	264
<i>Kateřina Sulovská</i>	
<u>Intelligent Video Surveillance System Evaluation Dataset Proposal Methodology</u>	275
<i>Jiri Sevcik</i>	
<u>Comparison of Corn and Corncob using as Fungal Culture Medium</u>	283
<i>Jaruwan Chutrong</i>	
<u>The Use of Simulation in Education of Security Technologies, Systems and Management</u>	287
<i>Petr Svoboda, Jiri Sevcik</i>	
<u>Performance of Hybrid Mobile Application UI Frameworks</u>	293
<i>Radek Vala, Roman Jasek</i>	
<u>Stress Intensity Factors in two Bonded Elastic Layers Containing Crack Perpendicular on the Interface with Different Elastic Properties</u>	307
<i>Mahdi Keikhaie, Nasser Keikhaie, Reza Keikhaie, M. M. Kaykha</i>	
<u>Safety Requirements for the Organization</u>	314
<i>Vladislav Stefka</i>	
<u>A Comparison of PSO and BFO Applications for the PID Controller Synthesis in Time-Delay Systems</u>	320
<i>Ilir Juniku, Petraq Marango</i>	
<u>An Efficient VM Load Balancer for Cloud</u>	333
<i>Ansuya Makroo, Deepak Dahiya</i>	
<u>Evaluation of Effectiveness of Alarm Systems</u>	360
<i>Jan Valouch</i>	
<u>Orthogonal Chaotic Sequence Generation for a Class of Stochastic Wireless Channels</u>	369
<i>Anamika Sarma, Kandarpa Kumar Sarma, Nikos Mastorakis</i>	
<u>Task Formation Commander's Operation Order for Fire Support</u>	380
<i>Martin Blaha, Karel Šilinger</i>	
<u>CloudAnalyzer: A Cloud Based Deployment Framework for Service Broker and VM Load Balancing Policies</u>	389
<i>Komal Mahajan, Deepak Dahiya</i>	

