Contents – Part I

Computational Methods, Algorithms and Scientific Applications

A Nonlinear Multiscale Viscosity Method to Solve Compressible Flow Problems ......................................................... 3
Sérgio Souza Bento, Leonardo Muniz de Lima, Ramoni Zancanela Sedano, Lucia Catabriga, and Isaac P. Santos

“Extended Cross-Product” and Solution of a Linear System of Equations ............................................................ 18
Vaclav Skala

Dynamical Behavior of a Cooperation Model with Allee Effect ................................................................. 36
Unal Ufuktepe, Burcin Kulahcioglu, and Gizem Yuce

Stability of a Certain 2-Dimensional Map with Cobweb Diagram ............................................................. 45
Sinan Kapçak

A New Heuristic for Bandwidth and Profile Reductions of Matrices Using a Self-organizing Map .............................................. 54
Sanderson L. Gonzaga de Oliveira, Alexandre A.A.M. de Abreu, Diogo Robaina, and Mauricio Kischinhevsky

Modeling Combustions: The $ab$ initio Treatment of the O(3P) + CH$_3$OH Reaction .............................................................. 71
Leonardo Pacifici, Francesco Talotta, Nadia Balucani, Noelia Faginas-Lago, and Antonio Laganà

Point Placement in an Inexact Model with Applications ................................................................. 84
Kishore Kumar V. Kannan, Pijus K. Sarker, Ahammad Turdaliev, and Asish Mukhopadhyay

Development and Validation of a Logistic Regression Model to Estimate the Risk of WMSDs in Portuguese Home Care Nurses ............................................. 97
Ana C. Braga and Paula Carneiro

Analytical Spatial-Angular Structure of Uniform Slab Radiation Fields for Strongly Elongated Phase Functions ........................................ 110
Oleg I. Smokty

Acetone Clusters Molecular Dynamics Using a Semiempirical Intermolecular Potential ............................................. 129
Noelia Faginas-Lago, Margarita Alberti, and Andrea Lombardi
Cumulative Updating of Network Reliability with Diameter Constraint and Network Topology Optimization .................................................. 141
Denis A. Migov, Kseniya A. Nechunaeva, Sergei N. Nesterov, and Alexey S. Rodionov

Set Covering Problem Resolution by Biogeography-Based Optimization Algorithm .............................................................. 153
Broderick Crawford, Ricardo Soto, Luis Riquelme, Eduardo Olguín, and Sanjay Misra

Finding Solutions of the Set Covering Problem with an Artificial Fish Swarm Algorithm Optimization .................................................. 166
Broderick Crawford, Ricardo Soto, Eduardo Olguín, Sanjay Misra, Sebastián Mansilla Villablanca, Álvaro Gómez Rubio, Adrián Jaramillo, and Juan Salas

Linear Programming in a Multi-Criteria Model for Real Estate Appraisal . . . 182
Benedetto Manganelli, Pierfrancesco De Paola, and Vincenzo Del Giudice

A Prioritisation Model Aiding for the Solution of Illegal Buildings Problem . . 193
Fabiana Forte, Maria Fiorella Granata, and Antonio Nesticò

Solving the Set Covering Problem with a Binary Black Hole Inspired Algorithm ................................................................. 207
Álvaro Gómez Rubio, Broderick Crawford, Ricardo Soto, Eduardo Olguín, Sanjay Misra, Adrián Jaramillo, Sebastián Mansilla Villablanca, and Juan Salas

Solving Biobjective Set Covering Problem Using Binary Cat Swarm Optimization Algorithm ...................................................... 220
Broderick Crawford, Ricardo Soto, Hugo Caballero, Eduardo Olguín, and Sanjay Misra

An Accelerated Multistart Derivative-Free Framework for the Beam Angle Optimization Problem in IMRT ........................................ 232
Humberto Rocha, Joana M. Dias, Tiago Ventura, Brígida C. Ferreira, and Maria do Carmo Lopes

Collisional Energy Exchange in CO$_2$–N$_2$ Gaseous Mixtures .................. 246
Andrea Lombardi, Noelia Faginas-Lago, Grossi Gaia, Palazzetti Federico, and Vincenzo Aquilanti

A Theoretical and Computational Approach to a Semi-classical Model for Electron Spectroscopy Calculations in Collisional Autoionization Processes . . 258
Stefano Falcinelli, Marzio Rosi, Fernando Pirani, Noelia Faginas Lago, Andrea Nicoziani, and Franco Vecchiocattivi
Solving Set Covering Problem with Fireworks Explosion

Broderick Crawford, Ricardo Soto, Gonzalo Astudillo, Eduardo Olguín, and Sanjay Misra

Simulation of Space Charge Dynamics in High Intensive Beams on Hybrid Systems

Natalia Kulabukhova, Serge N. Andrianov, Alexander Bogdanov, and Alexander Degtyarev

A Theoretical Study on the Relevance of Protonated and Ionized Species of Methanimine and Methanol in Astrochemistry

Marzio Rosi, Stefano Falcinelli, Nadia Balucani, Noelia Faginas-Lago, Cecilia Ceccarelli, and Dimitrios Skouteris

An Algorithm for Smallest Enclosing Circle Problem of Planar Point Sets

Xiang Li and M. Fikret Ercan

Simulation of Methane Production from Carbon Dioxide on a Collaborative Research Infrastructure

Carles Martí, Leonardo Pacifici, Andrea Capriccioli, and Antonio Laganà

Multi-pattern Matching Algorithm with Wildcards Based on Euclidean Distance and Hash Function

Ahmed Abdo Farhan Saif and Liang Hu

Improving Efficiency of a Multistart with Interrupted Hooke-and-Jeeves Filter Search for Solving MINLP Problems

Florbela P. Fernandes, M. Fernanda P. Costa, Ana Maria A.C. Rocha, and Edite M.G.P. Fernandes

Strengths and Weaknesses of Three Software Programs for the Comparison of Systems Based on ROC Curves

Maria Filipa Mourão and Ana C. Braga

An Approach to Solve the Set Covering Problem with the Soccer League Competition Algorithm

Adrián Jaramillo, Broderick Crawford, Ricardo Soto, Sanjay Misra, Eduardo Olguín, Álvaro Gómez Rubio, Juan Salas, and Sebastián Mansilla Villablancá

Direct Sequential Based Firefly Algorithm for the α-Pinene Isomerization Problem

Ana Maria A.C. Rocha, Marisa C. Martins, M. Fernanda P. Costa, and Edite M.G.P. Fernandes
Extensions of Firefly Algorithm for Nonsmooth Nonconvex Constrained Optimization Problems ................................. 402
  Rogério B. Francisco, M. Fernanda P. Costa, and Ana Maria A.C. Rocha

Lie Algebraic Methods as Mathematical Models for High Performance Computing Using the Multi-agent Approach .................. 418
  Serge N. Andrianov and Nataliia Kulabukhova

Spin-Coupling Diagrams and Incidence Geometry: A Note on Combinatorial and Quantum-Computational Aspects .................. 431
  Manuela S. Arruda, Robenilson F. Santos, Dimitri Marinelli, and Vincenzo Aquilanti

Mobile Device Access to Collaborative Distributed Repositories of Chemistry Learning Objects ........................................... 443
  Sergio Tasso, Simonetta Pallottelli, and Antonio Laganà

New Approach to Calculate Adiabatic Curves of Bound States and Reactive Scattering in Quantum Chemistry Problems ........... 455
  Fernanda Castelo Branco de Santana, Angelo Amâncio Duarte, Mirco Ragni, Ana Carla Peixoto Bitencourt, and Herman Augusto Lepikson

Continuous Time Dynamical System and Statistical Independence ................................................................. 470
  Madalin Frunzete, Lucian Perisoara, and Jean-Pierre Barbot

NCS-EC: Network Coding Simulator with Error Control ................................................................. 480
  Aicha Guefrachi, Sonia Zaibi, and Ammar Bouallègue

Trends in Students Media Usage ................................................................. 491
  Gerd Gidion, Luiz Fernando Capretz, Michael Grosch, and Ken N. Meadows

Short Papers

Computational Investigation of Heat Transfer of Nanofluids in Microchannel with Improper Insulation ................................. 505
  Vai Kuong Sin, Ka Kei Teng, and Wen Yue Deng

Modelling the MSSG in Terms of Cellular Automata ................................................................. 514
  Sara D. Cardell and Amparo Fuster-Sabater

A Novel Trust Update Mechanism Based on Sliding Window for Trust Management System ................................................................. 521
  Juanjuan Zhang, Qibo Sun, Ao Zhou, and Jinglin Li

Some Problems of Fuzzy Networks Modeling ................................................................. 529
  Kirill E. Garbusov
<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Transparent Accelerating Software Architecture for Network Storage</td>
<td>536</td>
</tr>
<tr>
<td>by Qiuli Shang, Jinlin Wang, and Xiao Chen</td>
<td></td>
</tr>
<tr>
<td>A Feature Selection Method of Power Consumption Data</td>
<td>547</td>
</tr>
<tr>
<td>by Changguo Li, Yunxiao Zu, and Bin Hou</td>
<td></td>
</tr>
<tr>
<td>In-band Busy Tone Protocol for QoS Support in Distributed Wireless</td>
<td>555</td>
</tr>
<tr>
<td>Networks</td>
<td></td>
</tr>
<tr>
<td>by Xin Zhou and Changwen Zheng</td>
<td></td>
</tr>
<tr>
<td>An IoT Application: Health Care System with Android Devices</td>
<td>563</td>
</tr>
<tr>
<td>by Guanqun Cao and Jiangbo Liu</td>
<td></td>
</tr>
<tr>
<td>A TCP Traffic Smoothing Algorithm Based on Rate Pacing</td>
<td>572</td>
</tr>
<tr>
<td>by Qiuli Shang, Jinlin Wang, and Xiao Chen</td>
<td></td>
</tr>
<tr>
<td>A Hybrid PSO and SVM Algorithm for Content Based Image Retrieval</td>
<td>583</td>
</tr>
<tr>
<td>by Xinjian Wang, Guangchun Luo, Ke Qin, and Aiguo Chen</td>
<td></td>
</tr>
<tr>
<td>A Separate-Predict-Superimpose Predicting Model for Stock</td>
<td>592</td>
</tr>
<tr>
<td>by Xiaolu Li, Shuaishuai Sun, Kaiqiang Zheng, and Hanghang Zhao</td>
<td></td>
</tr>
<tr>
<td>Performance and Resource Analysis on the JavaScript Runtime for IoT</td>
<td>602</td>
</tr>
<tr>
<td>Devices</td>
<td></td>
</tr>
<tr>
<td>by Dongig Sin and Dongkun Shin</td>
<td></td>
</tr>
<tr>
<td>Enhancing the Reliability of WSN Through Wireless Energy Transfer</td>
<td>610</td>
</tr>
<tr>
<td>by Felicia Engmann, Jamal-Deen Abdulai, and Julius Quarshie Azasoo</td>
<td></td>
</tr>
<tr>
<td>Senior Potential Analysis: A Challenge that Contributes to Social</td>
<td>619</td>
</tr>
<tr>
<td>Sustainability</td>
<td></td>
</tr>
<tr>
<td>by Teresa Guarda, Filipe Mota Pinto, Juan Pablo Cordova, Maria</td>
<td></td>
</tr>
<tr>
<td>Fernanda Augusto, Fernando Mato, and Geovanni Ninahuapla Quiña</td>
<td></td>
</tr>
<tr>
<td>Sustainable Planning: A Methodological Toolkit</td>
<td>627</td>
</tr>
<tr>
<td>by Giuseppe Las Casas and Francesco Scorza</td>
<td></td>
</tr>
<tr>
<td>A Transnational Cooperation Perspective for “Low Carbon Economy”</td>
<td>636</td>
</tr>
<tr>
<td>by Alessandro Attolico and Francesco Scorza</td>
<td></td>
</tr>
<tr>
<td>Assessing Sustainability: Research Directions and Relevant Issues</td>
<td>642</td>
</tr>
<tr>
<td>by Francesco Scorza and Valentin Grecu</td>
<td></td>
</tr>
<tr>
<td>Author Index</td>
<td>649</td>
</tr>
</tbody>
</table>
Computational Science and Its Applications – ICCSA 2016
16th International Conference, Beijing, China, July 4-7, 2016, Proceedings, Part I
Gervasi, O.; Murgante, B.; Misra, S.; Rocha, A.M.A.C.;
Torre, C.M.; Taniar, D.; Apduhan, B.O.; Stankova, E.;
Wang, S. (Eds.)
2016, XXVII, 650 p. 202 illus., Softcover
ISBN: 978-3-319-42084-4