

Preface	XI
Scientific Programme	1
Author Index	379

Simulation Methodology

Modeling Cargo Clearance Duration Using Unshared Frailty Models Liberato Camilleri and David Kipchumba Kemboi	5
Estimating Persistence: Hurst Exponent vs Empirical Persistence Igor Litvine	13
Persistence and Long Memory in Random Processes Igor Litvine and Farai Mlambo.....	20

Simulation Optimization

Statistical Optimization with Averaging using a Mode of Six William Conley	31
Multi-Stage Monte Carlo Optimization with Averaging using a Mode of Eleven William Conley	37

Analytical and Numerical Simulation Techniques

Optimal Arrangement of Collocation Points in Pies for 2D Elastic Problems using PSO Agnieszka Boltuć and Eugeniusz Zieniuk	45
Method for Eliminating Singular Boundary Integrals in Pies for Two-Dimensional Poisson Problems Krzysztof Szerszeń and Eugeniusz Zieniuk	52
Trajectory Estimation with Natural Spline and Exponential Parameterization Ryszard Kozera and Magdalena Wilkołazka.....	57

Machine Learning

Machine Learning, Simulation and Reproducibility Impact of Random Numbers David R.C. Hill, Benjamin Antunes, Anthony Bertrand, Engelbert Mephu Nguifo, Loic Yon, Jeanne Nautré-Domanski and Violaine Antoine.....	65
---	-----------

Contents

Optimizing Predictive Performance through Machine Learning Algorithm Selection and Hyperparameter Tuning

Paulina Tsvetkova, Mayiana Mitevska and J. David Nuñez-Gonzalez.....71

Leveraging Machine Learning for Threat Hunting in Network Security

Velizar Varbanov and Tatiana Atanasova76

Augmented Single Instance-Driven Identification of Fungal Pathogens through the Convolutional Neural Networks

Rafal Wyszynski, Karol Struniawski and Aleksandra Konopka79

In Search of a Sequence Classifier for a System Employing NLP Encoding

Tomasz Strzoda, Joanna Polańska, Lourdes Cruz-Garcia, Mustafa Najim and Christophe Badie84

Capacitive Touch Sensor Modeling with a Physics-Informed Neural Network and Maxwell's Equations

Ganyong Mo, Krishna Kumar Narayanan, David Castells-Rufas and Jordi Carrabina90

Simulation in Biology and Medicine

Intraocular Lens Implant Support System for Patients with Astigmatism

Krzysztof Jaskot and Robert Bieda97

A Multi-Input Optimal Control Problem for Chemotherapy and Anti-Angiogenic Treatment

Mariusz Bodzioch.....104

Data-Driven Model for Chronic Kidney Disease Progression: A Work in Progress

Candelaria Alvarez, Remo Suppi, Jose Ibeas and Javier Balladini.....110

A Simplified Heart Age Model based on Cellular Automata

Beata Jackowska-Zduniak114

Social System Simulation

On Some Aspects of Computer Programming of Business Simulation Games using Parallel Computations: An Example of Developing a "National Economy Development" Game

Egor Lazarevich125

A Conceptual Modeling Framework for Socio-Technical Systems - A Case Study in Health Care
 Florian Schierlinger-Brandmayr, Philipp Url, Mario Mauberger, Siegfried Voessner, Heidrun Sagmeister, Elisa Sieghartsleitner, Karl Tamussino, Diether Kramer and Sigurd Lax.....130

Media-Text: A Media Industry-Based Dataset for Scene Text Detection
 Seweryn Kalisz, Michał Marczyk, Rafał Fagas and Joanna Polańska138

Hardware Acceleration of Agent-Based Simulations of Social Media
 Anna Gausen, Ce Guo and Wayne Luk.....145

Emotion Recognition using Biomedical Signals in a Multimodal Emotion Analysis System for Social Robots
 Kamil Skowroński, Adam Galuszka and Eryka Probierz153

Simulation in Emergency Management

Multi-Scale Discrete-Event Simulation Framework for Dynamic Combat Effectiveness Assessment
 Irene Ndindabahizi, Tom Vancayzeele, Ben Lauwens and Johan Gallant.....161

FFT Based Anomaly Detection in Railway Systems
 Asier Garmendia-Orbegozo, Ivan Araquistain Marquina, Miguel Angel Anton and Jose David Nuñez-Gonzalez.....169

Use of Information to Support Application Software and Simulations in Crisis Management
 Daniel Chovanec, Boris Kollár and Jozef Ristvej175

Diagnostic and Prevention Tools for Attacks in an Information System
 Mamadou Kassé, Cyrille Bertelle, Rodolphe Charrier and Alexandre Berred ...180

Strategic Wargame Toolset for the Investigation of Emerging Disruptive Technologies Impact in Multidomain Operations
 Andrzej Najgebauer, Ryszard Antkiewicz and Dawid Maślanik188

Human-in-the-Loop Simulation

A Simulation on Graph-Based Learning for Energy Generation-Consumption Prediction in Energy Communities
 Lucia Porlan-Ferrando, Raquel Riera-Lorenzo, Leire Hernandez-Lecuona, Ana Paula Aravena-Cifuentes and J. David Nuñez-Gonzalez199

Contents

Exploring Acceptance Factors of Internet of Things in Smart Home Marzie Sadat Kasaii and Rosaldo J.F. Rossetti	205
--	-----

State Dependent Time-Inhomogeneous CTMC Models of Customer Abandonment in Call Centers Maciej Rafal Burak.....	211
--	-----

Robotics Simulation and Navigation

Tuning of PID Controller Using IC Algorithm for a Capsubot Artur Babiarz	219
--	-----

Simulation of a SCARA Robot Movements-PID Controller Tuning Studying Dominik Muszyński and Artur Babiarz	224
--	-----

Path Planning of Guide Robot with Nonholonomic Constraints for Visually Impaired Assistance Tomasz Grzejszczak and Michał Lasak.....	229
--	-----

Application of RFID Tag Array to pose Estimation of a Moving Object Krzysztof Skrzypczyk.....	234
---	-----

Utilization of Haptic Feedback to facilitate Navigation for Visually Impaired Individuals Michał Lasak and Tomasz Grzejszczak.....	239
--	-----

Simulation in Engineering

Model-Based Systems Engineering and Mechanical Computer Aided Design Integration Raquel Arrontes Quiroga, Rhea Mathew and Rob Vingerhoeds.....	247
--	-----

Frequency Driven Screw Compressors State Prediction in Modern Air Control System Kamil Kasprzyk and Adam Galuszka	252
---	-----

An Artificial Neural Network Model to Predict the Vibration at the Hands of a Drill Operator Omarelfarouq Elgack, Saleh AlBaiti and Naser Nawayseh.....	259
---	-----

Simulation in Manufacturing

Using Digital Twins in a Scenario-based Simulation Approach to Develop and Validate Operations Concepts for Spacecraft Components Kristina Enes, André Kupetz, Gregor Jochmann and Juergen Roßmann	265
--	-----

ML-IDS Solution for Securing Flexible Manufacturing Simulator (FMS)-Based IIOT Architecture Aymen Wali, Hichem Mrabet and Abderrazek Jemai.....	270
Quantitative Assessment of Complexity in SysML Models Lakshmi Bhargav Gullapalli, Anoushka Bhatnager, Pierre de Saqui-Sannes and Rob Vingerhoeds	275
Hardware Computing	
A Simulator-Based Study of In-Network Computing in Parallel Computing Systems with Fat-Tree Network Topology Caglayan Dokme and Kayhan Imre	283
Influence of Selected IFPIES Parameters on CPU Time and RAM Utilization Andrzej Kuźelewski and Eugeniusz Zieniuk.....	288
Increasing the Observation Capabilities of Small Solar Telescopes using Neural Networks Piotr Jóźwik-Wabik and Adam Popowicz	294
Renewable Energy Technologies	
Paradigmatic Case of Long-Term Co-location Wind-Wave Energy Feasibility Index Trend in Cantabrian Sea Hodei Ezpeleta Lopetegi, Oihana Aristondo Etxeberria and Alain Ulazia Manterola	303
Brainstorming on Green AI Approach by Dimensionality Reduction for Sea Waves Height Prediction Lucia Porlan-Ferrando, J. David Nuñez-Gonzalez and Alain Ulazia Manterola	311
Comparing the Resilience of Optimized Hybrid Renewable Energy Systems Lasse Hammer, Stephan Balduin and Eric MSP Veith	314
Smart Energy Grid Management	
Power Switch: Online vs. Offline Learning in the Energy Domain Arlena Wellßow and Eric MSP Veith.....	325
Cover Me: Safeguarding Multi-Agent System with Deep Reinforcement Learning for Resilient Grid Operation Eric MSP Veith and Emilie Frost.....	328

Contents

Tiered Durations: Scheduling at Different Time Resolutions Eike Schulte and Stephan Balduin.....	334
Enhancing Cyber-Physical Energy Systems Simulations through Communication Behavior Classification Malin Radtke and Sebastian Lehnhoff	339
 Smart Grid Co-Simulation	
Show-Off — Towards a Framework for Comprehensive and Systematic Visual Analysis of Learning Agents Performance in Smart Grid Co-Simulations Lena Engelmann, Arlena Wellssow and Eric MSP Veith	347
An Open-Source Carbon Emissions Simulator for Smart Grid Co-Simulation Scenarios Danila Valko, Sharaf Alsharif and Deborah Tolk	355
MASSCA: Scalable Multi-Agent System Framework for Smart Power Cell Co-Simulation Danila Valko, Sharaf Alsharif, Deborah Tolk and Tobias Grimm.....	361
Co-Simulation Analysis for Large-Scale Electrolysers Integration in Electricity Grids Sharaf Alsharif, Danila Valko, Nils Huxoll, Jelke Wibbeke, Tobias Grimm and Michael Brand	369