

26th European Modeling and Simulation Symposium

(EMSS 2014)

**Held at the International Multidisciplinary Modeling and
Simulation Multiconference (I3M 2014)**

**Bordeaux, France
10-12 September 2014**

Editors:

**Michael Affenzeller
Emilio Jimenez
Yuri Merkuryev**

**Agostino G. Bruzzone
Francesco Longo
Lin Zhang**

ISBN: 978-1-63439-314-0

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2014) by CAL-TEK S.r.l.
All rights reserved.

Printed by Curran Associates, Inc. (2014)

For permission requests, please contact CAL-TEK S.r.l.
at the address below.

CAL-TEK S.r.l.
Via Spagna 240-242
87036 Rende (CS)
Italy

Phone: +39 333 7042 612
Fax: +39 0984 937849

info@cal-tek.eu

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2634
Email: curran@proceedings.com
Web: www.proceedings.com

Index

The model engineering for complex system simulation	1
Lin Zhang, Yuewei Shen, Xuesong Zhang, Xiao Song, Fei Tao, Ying Liu	
Teaching variance reduction in matlab	11
Jaroslav Sklenar	
Modeling and performance analysis of ammonia-water absorption refrigeration system for ocean-going fishing vessels	17
Li Ren, Zijian Guo, Hongxia Li	
Table top for scheduling and controlling constructions course	24
Caroline Cavalheiro, Ailton Soares Freire, Antônio Edesio Jungles	
Approach class library of high level parallel compositions to implements communication patterns using structured parallel programming	30
Mario Rossainz-López, Manuel I. Capel-Tuñón	
Data based identification of short term predictors for stock market trends using heterogeneous model ensembles	40
Stephan Winkler, Bonifacio Castaño, Sergio Luengo, Susanne Schaller, Gabriel Kronberger, Michael Affenzeller	
High level architecture virtual assistant framework	46
Josef Brozek, Bhakti Stephan Onggo, Antonin Kavicka	
Modelling and simulation of the non-ideal mixing behaviour of the crystallization stage in a sugar factory batch crystallizer	56
David Tejerina, Rogelio Mazaeda, César de Prada	
Modeling of lattice thermal expansion for simulation of thermal stress in 3D nano mosfets	65
Abderrazzak El Boukili	
The relationship between R&D expenses and performance: evidence from European manufacturing enterprises	72
Ondrej Zizlavsky, Michal Karas	
Identification of endothelial cell morphology in cornea using evolution strategies	79
Lisa Obritzberger, Susanne Schaller, Viktoria Dorfer, Claudia Loimayr, Simone Hennerbichler, Stephan Winkler	
Methodology for failure analysis in service processes through simulation	87
Oroselia Sánchez, Idalia Flores	
Hierarchical feature selection for biological data	93
Witold Jacak, Karin Pröll	
Probabilistic behavioral model for the detection of criticalities when using morphine and fentanyl PCA	98
Henrikas Pranevicius, Mindaugas Snipas, Tadas Kraujalis, Mindaugas Pranevicius, Osvaldas Pranevicius, Vytautas Pilkauskas	
Modeling of mechatronic systems in Matlab (Simulink / Simmechanics)	106
Irina Kalapyshina, Anna D. Perechesova, Konstantin A. Nuzhdin, Victor M. Musalimov, Georgiy B. Zamoruev	
On the approximate solution for a fully coupled parabolic-hyperbolic PDES system applied in thermomechanical behaviour of hydrogel matrix used in drug delivery	112
Nirina Santatriniaina, Benjamain Boutin, Eric Darrigrand, Fabrice Mahé, Nicolas	

Crouseilles, Dominique Pioletti, Lalaonirina Rakotomanana	
Simulation optimization for a vaccine distribution strategy against the spread of a (H1N1) epidemic.	120
Javier Lara de Paz, Idalia Flores	
Kinematics and dynamics analysis of different mechanisms using simmechanics / simulink / matlab	128
Anna D. Perechesova, Irina I. Kalapyshina, Konstantin A. Nuzhdin	
A mono parameter analysis on a simulation model to support GALB heuristic optimization algorithms based on resource balancing	136
Sergio A. Gallo, Giovanni Davoli, Andrea Govoni, Francesco Longo, Riccardo Melloni, Teresa Murino	
BankSim: a bank payments simulator for fraud detection research	144
Edgar Alonso Lopez-Rojas, Stefan Axelsson	
A multi-agent model of typical competitive bidding process in construction	153
Ronald Ekyalimpa, Simaan AbouRizk	
Mathematical modeling of the diversity in human B and T cell receptors using machine learning	164
Susanne Schaller, Johannes Weinberger, Martin Danzer, Christian Gabriel, Rainer Oberbauer, Stephan M. Winkler	
A multi task assignment method in cloud-based simulation	171
Lei Ren, Hejian Ou, Jin Cui, Bowen Li, Baocun Hou	
Empirical modeling and simulation for discharge dynamics enabling catchment-scale water quality management	175
Huma Zia, Nick R. Harris, Geoff V. Merrett	
Event-oriented control functions for enhancing development process of war-game simulators	184
Se Jung Kwon, Changbeom Choi, Tag Gon Kim	
Simulation as a service in construction	191
Sean Newstead, Simaan AbouRizk, Stephen Hague, Yasser Mohamed, Junhao Zou	
Digital human models (DHM) to simulate meat processing to prevent work related Musculoskeletal disorders (WR-MSDS)	199
Sergio Amedeo Gallo, Riccardo Melloni, Simone Mosconi, Francesco Longo	
Hierarchical approach to developing a logistic discrete event simulation model using automated guided vehicles	205
Pavel Raska, Zdenek Ulrych	
A physics simulation tool for the container loading problem	212
António G. Ramos, João Jacob, Jorge Justo, José F. Oliveira, Rui Rodrigues, António Miguel Gomes	
Towards a methodology for human behaviour elicitation: preliminary results	220
João Emilio Almeida, Rosaldo J.F. Rossetti, Brígida Monica Faria, João Tiago Jacob, Antóio Leça Coelho	
GPRS network monitoring of solar energy generation and supply in rural residences	229
Robson da Cunha Santos, Gerson Gomes da Cunha, Marcos António Cruz Moreira, Mónica Castelo Branco, David Douglas Nunes Oliveira, Matheus Muzitano Reis	
Approaching demand of cash transactions at bank branches	238
Miguel Aguilar Zaragoza, Idalia Flores de la Mota	
On the search for novel simulation application to support airport operations	245

management	
Olusola Theophilus Faboya, Peer-Olaf Siebers	
Analysis of obesity modelling	254
Maja Atanasijevic Kunc, Tina Sentocnik, Jože Drinovec	
Real time interaction and handling tool of historical data on timelapse record for construction management	263
Livia Fernandes, Gerson G. Cunha, Celia Lopes, Luiz Landau	
Mapping of wireless technologies to support real time location systems for tracking resources of large enterprises	269
Larissa P.M. Cruz, Luiz Landau, Gerson Gomes Cunha, Maria Célia S. Lopes	
Probabilistic approach as a support system for safety-critical environments by knowledge driven bayesian networks	280
Ciro D'Elia, Fabio De Felice, Paola Mariano, Antonella Petrillo, Simona Ruscino	
A multimodal optimization method for simulation systems	289
Zhizhao Liu, Wei Li, Ming Yang	
FEM analysis of radial-axial profile ring rolling process	295
Zhengkun Feng, Henri Champlaud	
Searching and indexing distorted data collections	301
Tomas Kocyan, Jan Martinovic, Michal Podhoranyi	
Train movement dynamics within AnyLogic tool	307
Roman Divis, Antonin Kavicka	
Self-optimizing real-time recommendation model design based on YARN	313
Tao Liu, Shuang Wang, Peng Wu	
Non HLA distributed simulation infrastructure	319
Jan Voracek, Jiri Penzes, Antonin Kavicka	
Predicting equipment availability using a high level architecture framework	325
Estacio Siemann Santos Pereira, Yasser Mohamed, Simaan AbouRizk	
Design and development of a distributed earthmoving simulation	334
Duanshun Li, Cristian Petre, Cayce Kerr, Tim Joseph, Simaan AbouRizk, Yasser Mohamed	
WebRTC technology as a solution for web-based distributed simulation	343
Stepan Kartak, Antonin Kavicka	
Combining DEVS and model-checking: using systems morphisms for integrating simulation and analysis in model engineering	350
Bernard P. Zeigler, James J. Nutaro	
Two stage simulation use in project verification and validation	357
Egils Ginters, Artis Aizstrauts, Miquel-Angel Piera Eroles, Roman Buil	
Migration among simulation paradigms and tools	364
Mairita Zake, Egils Ginters	
Utilization of computer simulation for the detection non-standard situations within the new data layer of railway network model	371
Jan Fikejz, Emil Rezanina	
Feedback DTC-SVM based a fractional PI controller: applied to rotor's speed of induction motor	378
Youcef Zennir, Lakhdar Bouras	
Influence of parked cars on smoke propagation during car park fire	384

Peter Weisenpacher, Ladislav Halada, Jan Glasa, Jan Aсталos	
ProOpter: production dynamics analysis and optimization tool	392
Gasper Music, Miha Glavan, Dejan Gradisar, Stanko Strmcnik	
Evolutionary algorithms for hyperparameter tuning on neural networks models	402
David Orive, Gorka Sorrosal, Cruz E. Borges, Cristina Martin, Ainhoa Alonso-Vicario	
Modeling the multi-compartment vehicle routing problem with stochastic demands	410
Jan Melechovsky	
Integrated simulation and optimization in HeuristicLab	418
Andreas Beham, Gabriel Kronberger, Johannes Karder, Michael Kommenda, Andreas Scheibenpflug, Stefan Wagner, Michael Affenzeller	
Production line modeling and balancing: comparison of existing techniques and proposal of a new methodology	424
Alessandro Silvestri, Cristina Cerbaso, GianPaolo Di Bona, Antonio Forcina, Vincenzo Duraccio	
Maintenance critical analysis and priority index: a new model for maintenance policy	432
Alessandro Silvestri, Cristina Cerbaso, Domenico Falcone, Antonio Forcina, Vincenzo Duraccio	
Towards a metamodel for airport modeling and simulation	438
Deniz Çetinkaya, Ismet Camci	
Simulation based analysis and development of decision support system for virtual network bandwidth management	444
Julija Asmuss, Gunars Lauks	
Using tablets in distributed simulation	451
Josef Brozek, Martin Jakes, Lumir Gago	
Speedsim.net - an open.net based simulation system	457
Thomas Wiedemann, Karsten Wendt	
Applying an adaptive petri net to calculate the makespan in the job shop scheduling problem	463
Joselito Medina-Marin, Juan Carlos Seck-Tuoh- Mora, Norberto Hernandez-Romero, Nayeli Jazmin Escamilla-Serna	
Modeling and optimization of the extraction of lignosulfonate from barley straw by using artificial neural networks	469
Maria Guadalupe Serna-Diaz, Joselito Medina-Marin, Ainhoa Arana-Cuena, Juan Carlos Seck-Tuoh-Mora, Alejandro Tellez-Jurado, Yuridia Mercado-Flores, Angelica Jimenez-Gonzalez, Norberto Hernandez-Romero	
A friday 13th risk model for failure in cross - flow membrane filtration of passion fruit juice	474
Wei Zou, Kenneth Davey	
A Novel friday 13th risk analysis of a global food process – application to pasteurization of raw milk containing mycobacterium avium paratuberculosis	480
Kenneth R. Davey, Saravanan Chandrakash, Brian K. O'Neill	
A new transient predictive model to quantify taint as either geosmin (GSM) or 2-methylisoborneol (MIB) in rainbow trout (Oncorhynchus Mykiss) farmed in recirculating aquaculture systems (RAS)	490
Kenneth R. Davey, Priyantha I. Hathurusingha	
A modified beer game for simulation and optimization teaching	498

Diego Crespo-Pereira, Adolfo Lamas-Rodriguez, Rosa Rios Prado	
A simple queue model for an appointment system and applications in a hospital CT scan facility	504
Francesco Boenzi	
Simulation and experimental analysis of led weatherproof luminaire thermal performance	517
Carlos Javierre, Daniel Elduque, Víctor Camañes, David Franch	
Fupol simulators and advanced visualization framework integration	523
Egils Ginters, Artis Aizstrauts, Mikelis Baltruks, Kawa Nazemi, Dirk Burkhardt, Peter Sonntagbauer, Susane Sonntagbaure, Jorge Martin Gutierrez	
Visualization techniques for simulation models in virtual reality	530
Arnis Cirulis, Egils Ginters	
A coloured petri net model for the MAS simulation of urban economics in Yantai	536
Roman Buil, Miquel Angel Piera, Egils Ginters, Artis Aizstrauts	
Single sourcing vs. double sourcing: a simulation approach for supplier selection	543
Mattia Armenzoni, Marta Rinaldi, Roberto Montanari, Eleonora Bottani, Federico Solari	
A conjecture from learning simulations of series and parallel connections of components	550
Alexandre Muzy, Bernard P. Zeigler	
Skopje bicycle inter modality simulator – E-involvement through simulation and ticketing	557
Egils Ginters, Artis Aizstrauts, Girts Dreija, Maija Ablazevica, Sergey Stepucev, Inita Sakne, Mikelis Baltruks, Miquel Angel Piera Eroles, Roman Buil, Marjan Gusev, Goran Velkoski	
DEVS models design and test using AGILE-based methods with DEVSimPy	563
Timothée Ville, Laurent Capocchi, Jean-Francois Santucci	
CPN-simulation methodology for the boarding process of aircraft	570
Miguel Mujica Mota, Idalia Flores, Daniel Guimaranas	
Tool profiles evaluation based on vibroacoustical signals generated by friction-stir welding	576
Julio Blanco-Fernández, Emilio Jiménez-Macías, Mario Sanchez-Orozco, Angel Sanchez-Roca, Hipolito Carvajal-Fals	
Evaluation of the erosive wear of the AA 6082 T6 alloy treated with friction stir Pprocessing (FSP)	582
E. Martínez-Cámara, J. Blanco-Fernández, Y.P. Chacón, A. Sanchez-Roca, H. Carvajal-Fals	
Design and operation of a dairy plant by means of a decision support tool based on the Petri nets paradigm	588
Juan Ignacio Latorre-Biel, Emilio Jiménez-Macías, Julio Blanco-Fernández, Eduardo Martínez-Cámara, Juan Carlos Sáenz-Díez, Mercedes Pérez-Parte	
Mixing formalisms based on Petri nets for improving the efficiency of modelling and simulation of DES	594
Juan Ignacio Latorre-Biel, Mercedes Pérez-Parte, Juan Carlos Sáenz-Díez, Jorge L. García-Alcaraz, Emilio Jiménez-Macías	
Disjunctive coloured Petri nets: a formalism for improving the applicability of CPN to the modeling of DES with alternative structural configurations	601
Juan Ignacio Latorre-Biel, Mercedes Pérez-Parte M, Emilio Jiménez-Macías	

Development of a Petri net model for a reconfigurable intelligent system based on experimental data	608
Juan Ignacio Latorre, Karim El-Laithy, Martin Bogdan, Emilio Jiménez	
Petri net representation with ciphered subnets: definition of PNML extensions for subnets representation and use of XML encryption for ciphering	613
Iñigo León-Samaniego, Juan-Carlos Sáenz-Díez, Jorge Luis García, Mercedes Pérez-Parte	
Production of compost for mushroom cultivation: a life cycle assessment study	620
Francisco J. Leiva-Lázaro, Julio Blanco-Fernández, Eduardo Martínez-Cámara, Emilio Jiménez-Macías	
Modeling of alternative for in situ unidirectional slabs	626
Esteban Fraile-García, Javier Ferreiro-Cabello, Eduardo Martínez-Cámara	
Model engineering for cyber complex adaptive systems	632
Saurabh Mittal	
Serious game at increased impact on culture and tourism	641
Francesco Longo, Letizia Nicoletti, Stefano Vena, Antonio Padovano	
Disaster and emergency management simulation in industrial plants	649
Agostino G. Bruzzone, Marco Frascio, Francesco Longo, Alessandro Chiurco, Simone Zanoni, Lucio Zavanella, Paolo Fadda, Gianfranco Fancello, Domenico Falcone, Fabio De Felice, Antonella Petrillo, Pasquale Carotenuto	
A system dynamics approach for improving container terminal operations	657
Giuseppe Converso, Mosè Gallo, Teresa Murino	
Innovation in hospitals: an e-procurement model in pharmacy operations in day surgery	662
Piera Centobelli, Giuseppe Converso, Antonio De Iasi, Teresa Murino	
Health worker monitoring: Kalman-based software design for fault isolation in human breathing	668
Improta Giovanni, Natale Pasquale, Santillo Liberatina Carmela, Triassi Maria	
The industrial plants relocation: issues, policies, procedures and algorithms for disassembly and reassembly phases	673
Massimo De Falco, Pellegrino Gaita, Mario Ilami, Liberatina Carmela Santillo	
Author's Index	679