Editorial

Francesco Longo

Department of Mechanical, Energy and Management Engineering,
University of Calabria,
Via Pietro Bucci, 87036 Rende (CS), Italy
E-mail: f.longo@unical.it

Biographical notes: Francesco Longo is an Assistant Professor and the Director of the Modelling and Simulation Center – Laboratory of Enterprise Solutions at DIMEG, University of Calabria. His research interests are the development of innovative and advanced simulation approaches in different domains, including industry, defence and logistics. He actively supports the organisation of the most important international conferences in the field of modelling and simulation, serving as the General/Programme Chair. He has published more than 170 scientific articles on international conferences and journals.

Nowadays modelling and simulation has proved to be the mainstream technology for complex technical systems, such as industrial plants, manufacturing systems and service systems. As a matter of fact, M&S technologies can provide the users with valuable insights into a broad spectrum of activities, including planning, decision making and control. The latest trends in economy have given a further boost to M&S applications. Thinking of the increasing competitive pressure, the increasing products/processes/ services complexity and variety, the need for a great flexibility and for shorter life cycles, the cost pressure as well as the demands on higher quality standards, it is evident that M&S, meant to be "the reproduction of a real system with its dynamic processes in a model aimed at reaching transferable findings for the reality", offers substantial benefits. In fact, M&S can support the identification of bottlenecks and hidden potentials, the test of control effectiveness, the evaluation of different planning alternatives as well as the review of management and operational strategies for decision making.

Nevertheless, to take full advantage of this technology there are relevant issues related to the effort needed to deploy simulation tools, the simulation models' reliability, and the integration within the real system for data acquisition, performance measurement and analysis. These issues keep challenging the researchers towards even more advanced solutions and approaches where emerging and cutting-edge technologies are absorbed. In this framework, this Special Issue is intended to show some relevant and innovative applications of M&S to industrial plants, processes and services. Such applications rely on the combination of theory and practice covering both technical and economic aspects to capture the intrinsic complexity, providing a realistic picture of the dynamic behaviour under uncertainty with a low computational and modelling burden. Therefore, in this framework, M&S is becoming even more pervasive, evolving toward a daily approach with improved visualisation capabilities providing information at a high semantic level so that even non-specialists can use and rationalise with it.

Getting into the heart of the matter, this Special Issue includes a selection of the best papers from the *International Multidisciplinary Modelling and Simulation Multiconference (I3M 2012)*. There are nine papers covering simulation approaches intended for decision making, performances evaluation, operational analysis, planning and optimisation:

- Analysis of the operations of an intermodal barge terminal, by Verdonck et al.
- Analysis and optimisation of inventory management policies for perishable food products: a simulation study, by Bottani et al.
- A parameterised model of multimodal freight transportation for maritime services optimisation, by Rios Prado et al.
- Layout and process optimisation: using computer-aided design and simulation through an integrated systems design tool, by Dias et al.
- CFD modelling of thermal distribution in industrial server centres for configuration optimisation and energy efficiency, by Paradis et al.
- Integrated planning and scheduling built on cluster analysis and simulation optimisation, by Merkuryeva and Bolshakov
- Situation awareness in critical infrastructures, by Pascucci et al.
- Hybrid approach for container terminals' performance evaluation and analysis, by Nicoletti et al.
- Simulation as enabling technologies for agile thinking: training and education aids for decision makers, by Bruzzone et al.

Copyright © 2014 Inderscience Enterprises Ltd.

In particular, operational analysis as covered by Verdonck et al. aims at studying the operations of an intermodal barge terminal by performing a simulation study based on real data from the Haven Genk trimodal terminal.

The use of simulation-based optimisation and performance analysis can be found in Bottani et al., Rios Prado et al., Dias et al., Paradis et al., Merkuryeva and Bolshakov, and Nicoletti et al.

Bottani et al. propose an ad hoc simulation model devoted to reproduce a real two-echelon supply chain in order to simulate the flow of food products with different shelf-life characteristics according to three reorder policies: economic order interval (EOI), economic order quantity (EOQ) and (S, s).

Rios Prado et al. present a parameterisation schema of a freight transport model that allows the application of optimisation algorithms for the maximisation of profitability when assessing multimodal transport services.

Dias et al. focus on design issues, pertaining to internal logistics, of production systems in the automotive industry. A real case study is used as test bed of the integrated design of systems (IDS) tool.

Paradis et al. present a computational fluid dynamics (CFD) model devoted to evaluate different cooling solutions of a data centre and propose guidelines to improve its energy efficiency.

Merkuryeva and Bolshakov propose an integrated approach for product delivery planning and scheduling in distribution centres. The approach is based on cluster analysis, computer simulation and metaheuristic optimisation, and is devoted to improve decision processes at tactical and operational levels.

Nicoletti et al. propose a hybrid approach based on the joint use of simulation and genetic algorithms to investigate vessels' turn-around time in a real container terminal under different scenarios, including various container and vessel traffic conditions.

Moreover, simulation is used for improving decision making in Bruzzone et al., who propose an interdisciplinary research based on modelling and simulation and serious gaming. The research aim is to develop a general methodology and a set of games for decision makers in different areas.

Lastly, Pascucci et al. present a review of the approaches proposed for addressing the situation awareness problems. The review analysis is focused on models, architectures, and techniques evaluating strengths and weaknesses. An application example in the field of air traffic management is presented.

This Special Issue has to be regarded as the final result of a joint effort carried out by authors, reviewers and journal managers who have worked hard to improve the quality and the relevance of the papers. Therefore I would like to thank all of them for their contribution; special thanks go to the journal Editor-in-Chief Dr. M.A. Dorgham and to the journal Editorial Board for the support they have given.