Editorial

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Biographical notes: Ahmed Rhif received his Engineering Diploma, Master's and PhD Diploma all in Electrical Engineering, from the National School of Engineers of Tunis, Tunisia (ENIT). He worked as a technical responsible and Project Manager in both LEONI and CABLITEC (engineering automobile companies). Then, he worked as a Lecturer in some universities. He is currently pursuing his research in Laboratory for Advanced Systems at the Polytechnic School of Tunisia (EPT) and he is the Founder and Dean of International Center for Sciences and Development (ICSD).

Sundarapandian Vaidyanathan is a Professor and the Dean at the Research and Development Centre, Vel Tech University, Chennai, India. He earned his DSc in Electrical and Systems Engineering from the Washington University, St. Louis, USA in 1996. His current research focuses on linear and nonlinear control systems, chaotic and hyperchaotic systems, chaos control and synchronization, circuit simulation, backstepping control, sliding mode control, intelligent control, mathematical models of biology, computational science and robotics. He has published three text-books on mathematics and nine research books on computational intelligence, chaos and control systems. He has published over 400 Scopus-indexed research publications. He has delivered plenary lectures on control systems, nonlinear dynamics and chaos theory in many international conferences around the world. He has also conducted many workshops on computational science using MATLAB and SCILAB.

The Third International Conference on Automation, Control, Engineering and Computer Science (ACECS-2016) was conducted during 20–22 March, 2016, at Hammamet, Tunisia. The conference provided an excellent forum for professionals, academics, and researchers to share knowledge and results on automation, control, engineering, computer science and information technology. Broad areas of ACECS-2016 were classified as computer science and IT, signal processing and communication, robotics, control and instrumentation, engineering and automation, and innovation and engineering management.

Process modelling and simulation have recently become some of the most exciting research topics in the broad area of process control. Some typical examples of processes are: energy generation, electric power transmission, distribution systems, chemical and petrochemical industry, metallurgical industry, traffic and transportation systems, paper and pulp processing industry, food and fermentation industry, environmental systems, mining instrumentation, innovation and engineering management, etc. Recently, there is great research interest in areas such as big data and cloud computing, and their applications in process modelling and simulation.

In this special issue of the *International Journal of Simulation and Process Modelling* (*IJSPM*), we are delighted to select four research articles reporting on recent advances in simulation and process modelling. These papers presented in the ACECS-2016 have been expanded in line with the reviewer recommendation and audience questions.

It is hoped that this special issue will provide a useful reference for informing recently developed technologies in simulation, processes and modelling. The contents of the selected four articles are described briefly as follows:

The paper titled 'Modelling and hardware co-simulation of a Quadrotor unmanned aerial vehicle', by Soufiene Bouallègue and Rabii Fessi, investigates the modelling and hardware co-simulation of a quadrotor vertical take-off and landing (VTOL) type of unmanned aerial vehicle (UAV). The developed hardware co-simulation platform is based on a reconfigurable I/O (RIO) board of National Instruments (NI) Company, called sbRIO-9636, and a host PC with a real-time operating

system (RTOS). The control design and simulation (CDSim) module of LabVIEW environment as well as an established network streams data communication protocol are used to emulate and co-simulate all flight dynamics within a processor-in-the-loop (PIL) framework. Hardware simulations are carried out and compared to those obtained with software simulations in order to show the effectiveness of the proposed PIL co-simulation strategy.

The paper titled 'Artificial neural networks for acquisition and processing of sensors data in a radiotherapy application', by Kheireddine Lamamra, Abdelkrim Allam and M'hammed Afiane, describes the acquisition and processing of coded data from a temperature sensor of type MS6503 used in radiotherapy rooms of the Hospital Pierre and Marie Curie Centre (PMCC). The aim is to acquire and check remotely the temperatures of rooms to trigger alarms and its control thereafter in order to avoid mistakes of manipulation which are deadly for patients if they happen or arise. For this, a system modelling is made before proceeding to the implementation in practice. During the implementation, several problems have occurred such as the legibility of the received data that has been encrypted. To overcome this problem, an artificial neural network type of multi-layer perceptron is used to acquire and decrypt the temperature data received from the sensors placed in the treatment rooms. The obtained results show that the neural network used has decrypted well the received data, which is the reason why this technique has been implemented in the realised solution.

The paper titled 'Continuous Petri nets and hybrid automata: two bisimilar models for the simulation of positive systems', by Latéfa Ghomri and Hassane Alla, presents the continuous Petri nets (PN) and their modelling advantages. PNs are a well-known modelling tool for discrete event systems. Continuous PNs were introduced in order to avoid the combinatory explosion of the number of states, when considering real life systems. The constant speed continuous Petri net (CCPN) can be used to model discrete events systems; in that case, they constitute an approximation, which is often satisfactory. They can also model positive continuous systems. Hybrid automata are a less compact and expressive model, but they can be used to perform powerful analysis. The main contribution of this paper is a structural translation algorithm from a CCPN into hybrid automata. The translation algorithm is structural in the sense that it does not depend on the initial marking of the PN. The timed bisimilarity between both models is also proved in this work.

The paper titled 'Modelling and simulation of an analytical approach to handle real-time traffic in VoIP network', by Sakshi Kaushal, Harish Kumar, Sarbjeet Singh, Shubhani Aggarwal, Jasleen Kaur and Sundarapandian Vaidyanathan, uses an extension of the Erlang B model for traffic engineering VoIP, i.e., extended Erlang B model. The main purpose for the extended Erlang B is that it has better efficiency to handle the percentage of blocked calls by choosing a threshold value ($\propto$). In recent years, internet protocol (IP) has become a good choice over public switched telephone network (PSTN). VoIP implementation uses hard IP phones, soft IP phones and uses Softswitch for call signalling. The Erlang B model is used to determine the number of trunks in a circuit switched network and found traffic intensity and grade of service (GoS). This work proposes a new measurement scheme based on extended Erlang B model using FreeSWITCH and simulated and analysed VoIP traffic. The authors have compared their proposed version with the original definition of EB model and presented further results from simulations. The proposed scheme is also analysed for other QoS parameters, i.e., jitter, end-to-end delay and MOS.

The guest editors would like to thank all the authors for submitting their manuscripts in this special issue. We would want to acknowledge the reviewers for their contributions in reviewing the papers and providing constructive comments to the authors. Finally, the guest editors would like to specially thank Professor Feng Qiao (the Editor-in-Chief of IJSPM) for his great help and support in organising and coordinating the publication of this special issue.