Editorial

Faouzi Bouani

National Engineering School of Tunis,
Rue Béchir Salem Belkhiria,
Campus Universitaire,
BP 37, Le Belvédère, 1002, Tunis, Tunisia
Email: faouzi.bouani@enit.utm.tn

Ahmed Chemori

LIRMM, University of Montpellier, CNRS
161 rue Ada, 34095 Montpellier Cedex 5, France
Email: ahmed.chemori@lirmm.fr

Ali T. Alouani

Tennessee Tech University,
Cookeville, Tennessee, 38505, USA
Email: aalouani@tntech.edu

Biographical notes: Faouzi Bouani received his PhD and the Habilitation Universitaire in Electrical Engineering from Tunis El Manar University, Tunis, Tunisia, in 1997 and 2007, respectively. He is currently a Full Professor at National Engineering School of Tunis. He has authored or coauthored journal and conference papers in the area of linear, nonlinear and robust model predictive control. He is the author of a book about predictive control based on artificial neural networks, with CPU Editor, in 2015. His current research interests include robust and nonlinear predictive control, intelligent control systems and neural networks control.

Ahmed Chemori received his MSc and PhD, both in automatic control, from Polytechnic Institute of Grenoble, France, in 2001 and 2005, respectively. During the year 2004/2005 he was a Research and Teaching Assistant at Laboratory of Signals and Systems (LSS – Centrale Supelec) and University Paris 11. Then, he joined Gipsa-Lab (former LAG) as a CNRS postdoctoral researcher. He is currently a tenured research scientist in automatic control and robotics for the French National Center for Scientific Research (CNRS), at the Montpellier Laboratory of Computer Science, Robotics and Microelectronics (LIRMM). His research interests include nonlinear (robust, adaptive and predictive) controls and their real-time applications in robotics (under actuated robotics, parallel robotics, underwater robotics, humanoid robotics and wearable robotics).

Ali T. Alouani received his PhD in Electrical and Computer Engineering (ECE) from the University of Tennessee, Knoxville, USA in 1986. In 1987, he joined the ECE Department at Tennessee Tech University, where he is currently a Professor. He has published 29 refereed journal papers, 125 conference papers and two book chapters. He is the recipient of eight US Patents. He has served in multiple journal editorial boards. He chaired multiple sessions in national and international conferences. He is a senior member of the Institute of Electrical and Electronics Engineers (IEEE) and a member of several professional societies. He is listed in Marquis Who's Who in American Education and Marquis Who's Who in Sciences and Engineering. His research interest includes stochastic systems, smart grid, autonomous systems and home health monitoring.

This special issue of the *International Journal of Modelling, Identification and Control* (IJMIC) presents recent developments of algorithms and applications in the field of electrical engineering. A number of interesting papers were

received and after a thorough reviewing process, we are delighted to accept 11 of them. The papers cover various aspects of modelling and control methodologies, associated with various applications in electrical engineering. They mainly address challenging issues in modelling, parameter estimation and control design of real engineering plants. This is accomplished by further investigating both well-known and recently emerging techniques, including systems identification, fault detection, fault tolerance analysis, pilot resources and audio surveillance, synthesis of controllers and design of transistor.

It begins with the investigation of fault detection algorithms to support new applications. Ajmi et al. propose a new approach based on Gabor filter and Hough transform to detect multi-weld defects. In the second paper about fault detection by Touati et al., a wind energy conversion system is considered and a fault detection based on rotor currents analysis is investigated.

The third paper proposes numerical solutions to estimate the photovoltaic module parameters. These solutions are based on metaheuristic methods, such as particle swarm optimisation and genetic algorithms. A comparative study between the proposed algorithms has also been investigated.

The fourth and the fifth papers investigate algorithms in the field of signal processing. The authors of the fourth paper studied the harmful influence of employing a large number of pilot-resources on the performance of massive Multi-Input Multi-Output (MIMO) systems. The fifth paper deals with adaptation of deep learning auditory event recognition and detection in audio surveillance systems.

The special issue includes five papers dealing with control of dynamic and complex systems. In the paper by Added et al., the design of robust controllers with time specifications for systems with stochastic uncertainties is developed. Two approaches are proposed for the synthesis of the control scheme. The first one is the polynomial chaos method, which consists of the transformation of the stochastic dynamics to a deterministic high-order system. The second method is the worst-case synthesis based on min-max optimisation. Ouhibi et al. propose non-integer controllers for fractional order MIMO systems. In the presence of parametric uncertainties, the controller parameters are obtained by minimising a min-max non-convex optimisation problem. The paper by Zerzeri et al. discusses the possibilities for integration of Doubly-Fed Induction Motors (DFIM) in Electric Vehicle (EV) propulsion systems. It develops a control law for DFIM suitable for EV applications. A mixed control approach based on a DFIM, composed of a fuzzy-PI controller for the mechanical mode and a sliding mode controller for the electrical one, is proposed. Instead of treating the locomotion controller as an oscillator, the paper of Zaier et al. considers the overall control system as a Van der Pol oscillator, and the controller is then deduced accordingly. The last paper within the topic of control of dynamical and complex systems deals with the problem of stability analysis and fault-tolerant control of neutral systems. Lyapunov method and Linear Matrix Inequality (LMI) techniques are investigated to improve system stability and an adaptive-observer is designed to detect and estimate faults, complied with a new control law to achieve fault compensation.

The final paper of this special issue, by Guedri et al., discusses the structure of a high electron mobility transistor based on gallium nitride. The model developed in this work is characterised by its very small geometric dimensions and the extremely low electrical consumption of its circuit.

As guest editors of this special issue, we hope that the papers will be useful for researchers, practising engineers and students in the field of electrical engineering.

The guest editors would like to thank all the authors for submitting their manuscripts to this special issue. We would also like to acknowledge the reviewers for their meticulous work in reviewing the papers and providing constructive comments and suggestions that helped the authors to improve their papers. Finally, the guest editors would like to thank Prof. Quan Min Zhu (the Editor-in-Chief of IJMIC) for his consistent support.