Editorial

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Biographical notes: My El Hassan Charaf received his Engineer degree in Computer Science in 2004, and PhD in Computer Science from the Ibn Tofail University in 2013. He is currently a Professor of Computer Science and member of the Laboratory of Research in Informatics at Faculty of Sciences, Ibn Tofail University, Kenitra, Morocco. He has been the Chairman of the International Conference on Electronics, Control, Optimization and Computer Science as well as Co-Chair of many other research conferences. His present research interests include: distributed testing, control, distributed artificial intelligence and software testing.

Dimitri Lefebvre received his MEng in 1992, and PhD in Automatic Control and Computer Science in 1994, all from the Ecole Centrale in Lille, France. In 1995, he joined the University of Franche Comté, Belfort, France, where he served as an Associate Professor. Since 2001, he has been with the University Le Havre Normandie, France as a Professor. His current research interests include fault diagnosis and control design for dynamic systems and discrete event systems with applications to network security and safety in the domains of electrical engineering, robotics, transportations and logistics.

Ahmed Khoumsi received his Engineer degree in 1984 from the Engineer School Sup'Aéro, Toulouse, France. From 1984 to 1988, he conducted his research activities in the LAAS in Toulouse, and in 1988 he obtained his PhD from the University Paul Sabatier in Toulouse. From 1989 to 1992, he was an Assistant Professor at the Engineer School ENSEM, Casablanca, Morocco. From 1993 to 1996, he was a Postdoctoral Fellow at the University of Montreal. Since 1996, he is a Professor at the University of Sherbrooke, Canada. His present research activities include: design of discrete event systems, and using machine learning in electrical engineering.

Intelligent control attempts to enhance conventional control methodologies to solve new challenging control problems. Such approaches use various artificial intelligence techniques such as fuzzy logic, neural networks, machine learning, evolutionary computation, and genetic algorithms for modelling, verification, control and testing issues.

This special issue on 'Intelligent control for future and complex systems' covers the theory and applications of control systems. The aim is to provide a remarkable opportunity to the communities of scholars, researchers and academics to share their research manuscripts focusing on intelligent control methodologies and applications.

The contents of the four articles selected for this special issue are described briefly as follows.

The paper titled 'Robust hybrid controller for quadrotor UAV under disturbances', by Hamid Hassani, Anass Mansouri and Ali Ahaitouf, proposes a hybrid control strategy for trajectory control of an uncertain quadrotor

affected by complex aerodynamic disturbances. In this context, the authors develop a robust controller to stabilise the orientation of the vehicle. The developed controller consists of an adaptive SMC technique for the attitude subsystem, while a super-twisting non-singular terminal sliding mode control (NTSMC) is applied for the position dynamics. Furthermore, an adaptive rule is developed for the online tuning of the switching gains and a finite-time control law is designed for the quadrotor position, in which NTSMC is combined with the super-twist (ST) algorithm, in order to achieve a fast convergence. Finally, the proposed hybrid controller provides fast convergence with reduced influence of slamming and strong robustness. The authors tested the performance of the proposed control scheme under the influence of complex disturbances and the obtained results show that the proposed method provides good tracking performance with better robustness and reduced error in the steady state compared with the BSMC method.

The paper titled 'Black widow optimisation-based controller design for Riverol-Pilipovik water treatment system', by Nitin Mathur, V.P. Meena and V.P. Singh, suggests a black widow optimisation (BWO) algorithm-based proportional-integrative-derivative (PID) controller for the Riverol-Pilipovik (RP) water treatment plant. The plant is a two-input-two-output (TITO) system with two interacting loops. In this case, a decoupler is deployed in order to convert two interactive loops into non-interactive loops. The PID controller is designed for an interval model of the first loop, and the authors consider the interval model with both upper limits as well as lower limits. Moreover, the PID controller is designed by formulating and minimising an integral-square-error (ISE) using the BWO algorithm. Finally, the authors provide a comparative study by using BWO and Jaya algorithms. The results obtained affirm the fidelity of the proposed BWO-based PID controllers.

The paper titled 'Digital implementation of model predictive control of an inverter for electric vehicles applications', by Khawla Gaouzi, Hassan El Fadil, Zakariae El-Idrissi and Abdellah Lassioui, proposes model predictive control (MPC) of a DC-AC power converter for electric vehicle applications. The authors aim to regulate the output voltage of a three-phase inverter to the desired constant values. After elaborating the control law, the authors performed simulations using MATLAB/Simulink tools, and experiments were performed using a laboratory prototype that includes MicroLabBox-dSPACE. The obtained results show that the proposed MPC approach is suitable for controlling the DC-AC inverter for electric vehicle applications as it ensures a tight regulation of the output voltage to the desired values.

The paper titled 'Experimental and numerical study of the influence of FFF process parameters on the flexural properties of 3D printed medical devices and personal protective equipment', by Mohamed Abouelmajd, Ahmed Bahlaoui, Ismail Arroub, Manuel Lagache and Soufiane Belhouideg, aims to assess the mechanical properties of parts manufactured in polylactic acid by a 3D printer machine. To this end, the authors determine mechanical properties from the experimental results, which show that the mechanical properties depend mainly on the process parameters. Furthermore, the authors used the variance analysis to determine the printing parameters with significant effect on the mechanical properties. They determine also the optimal printing parameters to manufacture parts with safety and high mechanical performance. The individual and composite desirability function was used to evaluate the combination of optimal parameters. The two types of optimisation analysis, individual and composite, lead to two different optimal combinations. The combination [30 mm/s, 190°C, 0°] represents the optimal settings that will maximise the flexural strength, while the combination [54 mm/s, 210°C, 60°] allows to fabricate parts with the best mechanical behaviour, including the flexural strength, the bending modulus and the deflection at failure. The flexural behaviour of the finite element was performed using ANSYS Mechanical APDL software to validate the experimental results, and the flexural strength results were compared with the FEA results, which shows a relative error less than 1% that can be considered as a good agreement between FEA data and experimental results.

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 and useful comments to the authors. Finally, the guest editors would like to specially thank the Editor-in-Chief of *Int. J. Modelling, Identification and Control* (*IJMIC*), Prof. Quan Min Zhu (University of the West of England, UK) for his great help and support in organising and coordinating the publication of this special issue.