
Editorial

Nitaigour P. Mahalik*

Jordan College of Agricultural Sciences and Technology,
California State University,
Fresno, USA
E-mail: nmahalik@csufresno.edu
*Corresponding author

Mo Jamshidi

Centre for Autonomous Control Engineering,
University of Texas at San Antonio,
San Antonio, TX 78249, USA
E-mail: moj@wacong.org

Biographical notes: Nitaigour P. Mahalik received Master and PhD degrees in the year 1993 and 1998, respectively. He did Postdoctoral research in 2002 at Gwangju Institute of Science and Technology, South Korea. He visited Moscow State Technological University, University of Western Australia, McGill University and many others. With more than 90 publications, he has been serving several journals at various capacities. He is the recipient of Overseas and Brain-Korea Fellowships and several academic awards. He works in the areas of automation and control systems. Currently, he is at Jordan College of Agricultural Sciences and Technology in CSU Fresno, USA. He is the member of many professional societies.

Mo Jamshidi (F-IEEE, F-ASME, F-AAAS, F-NYAS, F-TWAS) received the PhD degree in Electrical Engineering from the University of Illinois at Urbana-Champaign in 1971. He holds three honorary doctorate degrees and is Lucher Brown Endowed Chaired Professor at the University of Texas System at San Antonio Campus, Texas, USA. Founding Director of Center for Autonomous Control Engineering (ACE) at the University of New Mexico (UNM). He is the Director of the National Consortium on System of Systems Engineering. He has over 550 technical publications including 58 books and edited volumes. He is the Founding Editor/Co-editor of five journals and one magazine.

This is the second issue for Vol. 4. It accommodates seven papers. The titles are as follows.

- 1 A sliding mode controller for SSSC to Delay Hopf bifurcation in a differential–algebraic power system model
- 2 Neural network inverse decoupling control of stator flux and torque for induction motor drives
- 3 Identification of fuzzy model of refrigerant condenser via Adaptive-Neuro-Fuzzy Inference System in vapour compression air conditioning system

- 4 Fuzzy improved adaptive neuro-NMPC for online path tracking and obstacle avoidance of redundant robotic manipulators
- 5 Computation of frequency responses for uncertain fractional-order systems
- 6 A generalised control metaheuristic framework for industrial processes
- 7 Hybrid bacterial foraging and particle swarm optimisation for fuzzy precompensated control of flexible manipulator

In the first paper, a sliding mode controller is proposed. The effectiveness of the controller is demonstrated in a bifurcation perspective. The purpose was to delay Hopf bifurcation in a differential–algebraic power system model. The controller can maintain load voltage as constant for higher reactive power loading. The situation is illustrated for a 3-machine, 9-bus system.

The second paper focuses on the development of a stator flux and torque decoupling mechanism based on artificial neural network (ANN) inverse system. The authors suggest a 3-layer feed-forward ANN with 11-40-2 structure in order to approach the inverse mode for induction motor drives. The implementation strategy can eliminate the coupling between stator flux and torque. The simulation results are provided to validate the effectiveness of the proposed scheme.

In the third paper, fuzzy model is identified to demonstrate the effect of refrigerant flow and condenser temperature. Adaptive Neuro-Fuzzy Inference System (ANFIS) was used to study the trend of condenser superheat depending upon condensing temperature and refrigerant mass flow rate.

A significant number of research papers are available on non-linear model predictive control (NMPC) for robotic manipulators. The fourth paper in this issue applies control action into the end-effector of the robotic manipulator that can track a path without collision with obstacles in the workspace. Fuzzy logic is used for online tuning of the weights in NMPC. The numerical simulations of a 4DOF redundant spatial manipulator, actuated by DC servomotors, show the effectiveness of the proposed method.

The accuracy and reliability issues while computing frequency response for the uncertain fractional-order systems have been a challenge in the control domain. The authors of the paper no. 5 have proposed an algorithm that can guarantee the frequency responses to a prescribed accuracy while the values are reliable. The algorithm also does not require any approximation. Above and all, it is computationally efficient.

The sixth paper suggests a heuristic control design scheme for multivariable non-linear processes. The framework is based on a metaheuristic search algorithm that utilises process simulation blocks. The authors claim that their method is an alternative, fast and simple approach as regards to heuristic controller design. The authors have also a plan to figure out the advantages and disadvantages of the present approach in comparison to other approaches in the field through many process and manufacturing control problems.

Last but not least, the final paper presents a hybrid approach combining the social foraging behaviour of *Escherichia coli* bacteria and particle swarm optimisation (PSO) for optimising hybrid fuzzy precompensated proportional and derivative (PD) controller in trajectory control of two link rigid–flexible manipulator. The objective of the research comes from the fact that the control problem of robots with flexible members is complex compared to rigid one due to vibrations during the motion.

We hope the researchers would enjoy reading the articles.