Editorial

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Biographical notes: S. Paramasivam received his BE from GCT, Coimbatore, in 1995, ME from PSG College of Technology, Coimbatore, in 1999 and PhD from College of Engineering, Anna University, Chennai, in 2004. He has published many papers on various aspects of SRM and induction motor drives in international journals and conferences worldwide. Currently, he is working at ESAB Group, Chennai, as the R&D Head for Equipments and Cutting Systems. His interests include power electronics, AC motor drives, DSP and FPGA-based motor controls, power-factor correction, magnetic design, fuzzy logic, neural networks and controller design for wind energy conversion systems.

N. Selvaganesan received his BE in Electrical Engineering, ME in Control Systems and PhD in System Identification from Mepco Schlenk Engineering College-Sivakasi, PSG College of Technology-Coimbatore and MIT Campus, Anna University, India in the year 1997, 2000 and 2005, respectively. He has ten years of research and teaching experience. Currently, he is working as an Assistant Professor in the Department of Electrical Engineering, Faculty in Avionics, IIST. He has published 17 international journal papers and more than 25 international/national conferences for his credit. His areas of interest include fault diagnosis, system identification, model reduction, converters and power filter control design.

This issue celebrates another successful special issue for publication in *IJAAC*. The acceptance rate of this special issue has been about 18%. We would like to thank the editor in chief, editorial board members and reviewers for their timely given valuable comments and suggestions to improve the quality of this issue. This issue has six papers which are given below.

1 A simple self-tuning scheme using fuzzy logic for a non-linear pressure regulating system.

2 Self-organised maps for online detection of faults in non-linear industrial processes.

3 Failure detection schemes in control actuation systems for launch vehicles.

4 Sensor location with respect to fault tolerance properties.

5 Online implementation of wavelet-based identification and dynamic matrix control in a heat exchanger unit.

6 Robust fault diagnosis of networked control systems via Kalman filtering.

The first paper presents a simple self-tuning approach using FLC and its performance is studied through a portable pressure regulating system. The proposed controller design concentrate more on improving the robustness and stability of the controller during process disturbances and changes in operating level and it was implemented in an ARM7 microcontroller-based embedded target board to study its applicability for real time pressure control application.

The second paper deals with a novel method have been proposed for online detection of faults in non-linear systems using self-organised maps. It is shown that the SOM-based methodology can detect faults as low as 5% of the signal magnitude and a comparative study is made between the proposed method and the well-known fault detection method using Dynamic PCA. The proposed methodology using SOM is applied onto the two non-linear processes namely, CSTR and biochemical reactor system. The results clearly demonstrate that the SOM-based method outperforms the DPCA for fault detection in non-linear systems.

The third paper studies a case study of a typical dual redundant electromechanical control actuation for launch vehicle system is highlighted. Various redundancy schemes were studied considering their merits and complexity of implementation. The configuration chosen ensures lesser switchover transient and has less complexity compared to triple and quad redundant systems. A dual redundant controller in active standby mode is realised and the test results are presented.

The fourth paper presents the sensor location of non-linear systems with respect to fault tolerance properties. The developed methodology is applied to a steam generator installation which represents complex non-linear system widely used in process engineering. Non-linear observability and individual observability indices are introduced and used to build minimal and redundant sensor sets. The evaluation of fault tolerance is based on fault tolerance properties: a structural and a probabilistic criteria, for which observability properties remain satisfied.

The fifth paper dealt with an online implementation of wavelet-based least square identification (WLSI) and wavelet-based dynamic matrix control (WDMC) in a plate-type heat exchanger unit. Wavelet domain 'blocking' and 'condensing' (B & C) techniques are used to reduce the computation time for optimisation of dynamic matrix control (DMC) performance index. Algorithms for WLSI and WDMC are developed and implemented in the online identification and control of temperature in a heat exchanger unit.

Fault detection problem of a class of linear networked control systems (NCS) with communication delays were studied in the final paper of this issue. The aim of the study is to generate residual signals which, in the fault free case, are supposed to be identically

zero. In practice, this condition is not satisfactory due to various factors such as measurements noise, model uncertainties and more specifically the NCS communication induced delays. The effect of unknown networked induced delays on conventional observed residue generator is also presented in this paper. The proposed approach is based on robust residual generation based on Kalman filtering.