Editorial

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Biographical notes: N.P. Mahalik received a ME and PhD in the year 1993 and 1998, respectively. He completed his Postdoctoral Research in 2002 and worked as invited faculty in Moscow State Technological University, Russia, Gwangju Institute of Science and Technology (GIST), South Korea between 2001 and 2004, respectively. He has published more than 80 papers and 5 books. He served as Editor, Guest Editor, Committee Member in several journals and conferences. He has been the recipient of National Overseas Scholarship and Brain-Korea fellowships for pursuing research especially in the field of interdisciplinary areas. He is a Member of many professional societies.

Mo M. Jamshidi (F-IEEE, F-ASME, F-AAAS, F-NYAS, F-TWAS) received a PhD in Electrical Engineering from the University of Illinois at Urbana-Champaign in 1971. He received three honorary Doctorate Degrees and is Lutcher Brown Endowed Chaired Professor at the University of Texas System at San Antonio Campus, San Antonio, TX, USA. He is the Founding Director of Center for Autonomous Control Engineering (ACE) at the University of New Mexico (UNM) and 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.

Once again the editors thank the reviewers and the editorial board members of the journal for sparing their valuable times in bringing out this issue. Above and all the authors of all the papers, included in this issue, must be acknowledged for their valuable contributions due to the fact that without their research results this issue could not have been completed. All the papers have been peer reviewed and recommended for publication. The publisher and the members thank Jihong Wang, Associate Editor, for coordinating the review process for this issue throughout.

The issue starts with a paper which presents the experimental research outcomes with regard to design and development of a new space-time scalable PI controller for a pasteurisation unit in dairy industry. Apparently, the performance of the controller is

attractive in the sense that it facilitates carrying out typical heat treatment process in which the material needs to be held to a specific temperature for a specified period of time. The controller is mostly suitable for applications requiring high temperature and low energy consumption rates as well as in the situation that carries out time varying temperature profile along the equipment wall. The author has claimed that the application of such controller can be extended to other processes with similar characteristics, for example, sugar production, cooling and beer pasteurisation.

In the second paper automation feasibility for a huge system has been studied. In this paper a 3D simulation study for automatic concrete pouring system useful in many large volume commercial and industrial construction applications is presented. In particular, a method for automatic pouring was analysed and the control process was simulated in 3D environment. The simulation result shows that the system can pour concrete along a long narrow field smoothly.

The third paper presents work on adaptive PID controller based on frequency domain system identification using various tuning rules. Especially, the comparison of various tuning methods concludes that the Ziegler Nichols tuning approach can provide reasonably good performance. The authors have developed auto-tuning algorithm. Through simulation study they have shown that the frequency domain adaptive PID controller has good control performance which can overcome long time delay.

The authors of the fourth paper have suggested that despite the performance advantages of full multivariate controller, decentralised control is almost the exclusive choice for control of large-scale systems. Especially for power system applications, decentralised control is necessitated due to physical distances between different stations and the large cost of establishing a communication network. In this paper, they present a method for system stabilisation through independent design of the decentralised controller. The suggested method extends the practical applicability of the μ-interaction measure to unstable systems.

Modelling, analysis, design and implementation are the various development phases of any automation and control systems. It is a fact that a model with a large number of degrees of freedom causes numerical difficulties in dynamic analysis. This is the reason why model reduction technique is widely used. The last paper of this issue deals with the model reduction aspects of typical smart plates. The authors have suggested that the study can be extended to find out the models in terms of lowest number of modes retained for various frequency ranges of interest.

Control design for heavy machine automation draws considerable attention due to the reason that the tolerances for position and antiswing are practically significant. Crane type systems used for faster material handling of heavy goods within cargo environment requires accurate control of the crane motion in order to achieve better dynamic performance. This suggests that faster cargo handling requires optimal and robust crane motion control.

The usefulness of soft computing tools in robotics is significantly important. For example, if there is a requirement to resolve the behaviour conflicts in the complex situation during mobile robot navigation, the soft computing tools can be called for! The seventh paper presents results with regard to development and validation of a new deterministic approach based on real world experiments. The framework of decision-making procedure incorporating α-level fuzzy logic is developed and discussed. The technique has been applied and experimented in a standard robotic platform. The approach uses linguistic logic rule without involving any mathematical model.

The scope of research on robotics is vast. In one aspect the coordination has been an important research topic since long. The problems are always classified under three main themes such as spatial coordination, temporal coordination and obviously spatio-temporal coordination. A paper has been devoted to address some of the insights of the issues in these domains. Accepting the fact that in a multi-agent coordination system a number of agents participate in executing a complex task in a cooperative manner, the behavioral model of eye and hand coordination is of prime concern. It has been shown that the collective learning behavior of a multi-agent system can be improved by the principles of Q-learning. The spatio-temporal coordination that deals with the coordination problems involving both space and time has been modeled using the timed Petri nets.