Editorial

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Biographical notes: Dimitrios Hristu-Varsakelis received his PhD in Engineering Sciences (1999) and MS in Applied Mathematics (1997) from the Division of Engineering and Applied Sciences at Harvard University. He is currently a faculty member in the Department of Applied Informatics at the University of Macedonia, in Thessaloniki, Greece. Previously, he has held a faculty position at the University of Maryland, College Park. He is a co-recipient of the 1999 Eliahu Jury award from Harvard University, and a co-recipient of the 2005 IFAC Young Author Prize. He currently serves on the Editorial Board of the *International Journal of Systems, Control, and Communications*.

Huijun Gao earned his PhD Degree in Control Science and Engineering from the Harbin Institute of Technology (HIT) in 2005 and he is currently a Professor at the Department of Control Science and Engineering in HIT. He also serves as an Associate Editor for many journals such as *IEEE Trans. on Systems, Man and Cybernetics Part B: Cybernetics* and *IEEE Trans. on Industrial Electronics*. His current research interests are on networked control systems, robust control and intelligent control, time-delay systems and

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Feng-Li Lian received the BS and MS Degrees from National Taiwan University, Taipei, Taiwan, in 1992 and 1994, respectively, and the PhD Degree from the University of Michigan, Ann Arbor, in 2001. From 2001 to 2002, he was a postdoctoral scholar at California Institute of Technology. In 2002, he joined the Faculty of the Electrical Engineering Department, National Taiwan University. He is the recipient of the Youth Automatic Control Engineering Award of the Chinese Automatic Control Society, Taiwan, in 2007, and the NTU Excellent Teaching Award in 2007 and 2008. His current research interests include distributed and networked control systems, multiple dynamical agent systems, trajectory generation and path planning.

The aim of this Special Issue was to expose recent developments in Networked Control Systems (NCSs), an area which has been developing rapidly since the mid-1990s. Research interest in NCSs has been fuelled in part by the proliferation of networking and communication technologies that made it increasingly easy to compose control systems which closed their feedback loops via networks. That, in turn, has led to a significant number of fruitful lines of inquiry, and a wealth of theoretical and experimental results. The main theme in most NCS research to date has been the attempt to elucidate the overlap between control and communication, and to steadily import into the new framework parts of control theory which had originally been developed without taking into account communication constraints. Some of the principal directions under study have involved the effects of limited network access by components of an NCS, communication delays, dropouts and lost data, and uncertainty in the behaviour of the network and/or the parameters of the plant. Some of these aspects are addressed in the present issue, with an emphasis on stabilisation-related problems, and with both experimental and theoretical contributions. The paper by Lai and Hsu discusses a multi-rate controller design for integrated wired-and-wireless NCSs, with experimental results from a system which combines CAN and IEEE 802.11g. The authors consider the (random) delays induced by the communication network, and present an online delay estimation algorithm which is then used to control the system's sampling rate. Zeng and Cao address the problem of synchronisation in singular NCSs (specifically, singular hybrid networks) with coupled delays, and derive a sufficient condition for global synchronisation in the form of a strict linear matrix inequality (LMI). Yu et al., consider the problem of robust stabilisation of NCSs where packets are transmitted over a token-passing bus, and the plant's parameters are uncertain. They obtain LMI-based

conditions for the existence of a stabilising feedback controller which are less conservative compared to previously established results for the same class of NCS. The paper by Seshadhri and Ayyagari presents an algorithm for designing dynamic state feedback controllers for NCSs with random communication delays in the loop, using Markov Chain Monte Carlo to estimate the delay in the communication channel. Finally, Kottenstette et al., discuss the problem of synthesising stable control networks in which multiple controllers are connected to multiple passive plants, with communication being subject to random delays and dropouts.

As guest editors, we would like to thank all authors who submitted their work to this Special Issue. We also gratefully acknowledge the help of the reviewers, who were kind enough to give us the benefit of their opinions on each manuscript. Finally, we thank Prof. Ge Guo, the Editor-in-Chief of the *International Journal of Systems, Control and Communications*, for giving us the opportunity to edit this Special Issue, and for keeping the review and publication process on track. We hope that readers of the IJSCC will find the Issue interesting and useful, and that the ideas contained herein will lead to further developments at the intersection between control and communication systems.