Editorial

Nonlinear Analysis of Dynamical Complex Networks 2014

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We have solicited submissions from electrical engineers, control engineers, computer scientists, and mathematicians. After a rigorous peer review process, 28 papers have been selected that provide overviews, solutions, or early promises, to manage, analyze, and interpret dynamical behaviours of complex systems. These papers have covered both the theoretical and practical aspects of complex systems in the broad areas of dynamical systems, mathematics, statistics, operational research, and engineering.

For networked control systems (NCSs), especially large-scale systems such as multiagent systems and systems over sensor networks, the complexities are inevitably enhanced in terms of their degrees or intensities because of the usage of the communication networks. This special issue starts with two survey papers on the recent advances of performance analysis with network-enhanced complexities and communication protocols for NCSs. In the paper entitled "*Performance analysis with network-enhanced complexities: on fading measurements, event-triggered mechanisms, and cyber attacks*" by D. Ding et al., the focus is to provide a timely review on the recent advances on the performance analysis and synthesis with three sorts of fashionable network-enhanced complexities, namely, fading measurements, event-triggered mechanisms, and attack behaviours of adversaries. These three kinds of complexities are introduced in detail according

to their engineering backgrounds, dynamical characteristic, and modelling techniques. Accordingly, the developments of the performance analysis and synthesis issues for various networked systems are systematically reviewed. Finally, some challenges are illustrated by using a thorough literature review and some possible future research directions are pointed out. Subsequently, in the paper entitled "*Time- and event-driven communication process for networked control systems: a survey*" by L. Zou et al., a timely review on the recent theoretical developments of various sampling procedures and communication protocols in time-driven communication and event-driven communication for NCSs is given. The results discussed include, but are not limited to the following aspects: (1) NCSs with time-driven sampling procedures, (2) NCSs with event-driven sampling procedures, and (3) NCSs subject to different communication protocols. Some recent advances on the analysis and synthesis issues of NCSs with different sampling procedures (time- and event-driven sampling) and protocols (static and dynamic protocols) are provided. These sampling procedures and protocols are firstly introduced in detail according to their engineering backgrounds as well as dynamic natures. Subsequently, the recent developments of the stabilization, control, and filtering problems are systematically reviewed and discussed in great detail. Finally, future research challenges for analysis and