Editorial

Networked Systems with Incomplete Information

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In this special issue, we have solicited submissions from electrical engineers, control engineers, computer scientists, and mathematicians. After a rigorous peer review process, 18 papers have been selected that provide overviews, solutions, or early promises, to manage, analyse, and interpret dynamical behaviours of networked systems. These papers have covered both the theoretical and practical aspects of networked system with incomplete information in the broad areas of dynamical systems, mathematics, statistics, operational research, and engineering.

In this special issue, there is a survey paper on the recent advances of control and filtering problems for Takagi-Sugeno (T-S) fuzzy systems with network-induced phenomena. Specifically, in the paper entitled "Analysis, Filtering, and Control for Takagi-Sugeno Fuzzy Models in Networked Systems" by S. Zhang et al., the focus is to provide a timely review on some recent advances on the T-S fuzzy control and filtering problems with various network-induced phenomena. Because of the advantages in dealing with various nonlinear systems, the fuzzy logic theory has great success in industry applications. Among various kinds of models for fuzzy systems, the T-S fuzzy model is quite popular due to its convenient, simple dynamic structure and the capability of approximating any smooth nonlinear function to any specified accuracy within any compact set. This survey discusses a variety of T-S fuzzy control and filtering issues with network-induced phenomena in great detail firstly. Four network-induced phenomena (communication delays,

packet dropouts, signal quantization, and randomly occurring uncertainties (ROUs)) are introduced. Both theories and techniques for dealing with the controller or filter design are systematically reviewed. Then, some latest results on T-S fuzzy control/filtering problems (bilinear T-S fuzzy model, event-based fuzzy control, fuzzy filtering with multiple network-induced phenomena, l_2–l_∞ fuzzy filtering, H_-/H_∞ fault detection, H_∞ filtering with unknown membership functions, and nonfragile H_∞ fuzzy filtering) for networked systems are surveyed and some challenging issues for future research are raised. Finally, some conclusions are drawn and several possible related research directions are pointed out.

In the past decades, the stability analysis of the networked systems has attracted much research attention. In the work entitled "Uniform Stability Analysis of Fractional-Order BAM Neural Networks with Delays in the Leakage Terms" by X. Yang et al., the uniform stability analysis is studied for a class of fractional-order BAM neural networks with delays in the leakage terms. By introducing a novel norm, several delay-dependent sufficient conditions are obtained to ensure the uniform stability of the proposed system by using inequality technique and analysis method. Moreover, sufficient conditions are established to guarantee the existence, uniqueness, and uniform stability of the equilibrium point. Three simulation examples are given to demonstrate the effectiveness of the obtained results. It should be pointed out that it is possible to extend the main results of this paper to other complex systems and establish novel stability conditions