

Editorial

Robust Control, Optimization, and Applications to Markovian Jumping Systems

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Markovian jumping systems have arisen naturally in the mathematical modeling of phenomena spanning disciplines in the social sciences, natural sciences, and engineering. This kind of stochastic dynamical systems can be employed to model the dynamics when parameters are subject to random abrupt changes due to sudden environment changes, subsystem switching, system noises, executor faults, and so forth. Much attention has been given to modeling, optimization, and real applications of such stochastic dynamical systems in the literature in recent years. As the advanced control and optimization will provide a basis for the design and application of such stochastic systems, these advanced techniques would result in substantial and sustainable benefits. The accepted papers in this special issue include stochastic stability, stabilization, stochastic control optimization, system modeling and identification methods, predictive control, signal processing, robust filtering, multiagent systems, networked control systems, time-delayed systems, neural networks, the Takagi-Sugeno fuzzy systems, simulated annealing, and fault detection methods.

We have accepted thirty-six papers in this special issue. In the published papers, eight consider the stability and stabilization problems of stochastic systems. There are fourteen papers which discuss the problems of the controller design and relevant optimization algorithms. Six articles study the system modeling and identification methods. One

paper focuses on the fault detection for wireless networked control systems with stochastic uncertainties and multiple time delays, and seven consider the state estimation and filtering problems.

The problems of stochastic stability and stabilization problems of Markovian jumping systems have been extensively studied by many researchers, and many relevant results have been made. The paper entitled “*Sufficient conditions on the exponential stability of neutral stochastic differential equations with time-varying delays*” by Y. Tian and B. Chen considers the exponential stability in almost sure sense of the neutral stochastic differential equations with time-varying delays and the paper entitled “*Delay-dependent robust exponential stability and H_∞ analysis for a class of uncertain Markovian jumping system with multiple delays*” by J. Xia deals with the problem of robust exponential stability and H_∞ performance analysis for a class of uncertain Markovian jumping systems with multiple delays. The paper entitled “*On input-to-state stability of impulsive stochastic systems with time delays*” by F. Yao et al. is concerned with p th moment input-to-state stability and stochastic input-to-state stability of impulsive stochastic systems with time delays. The paper entitled “*Absolute stability of a class of nonlinear singular systems with time delay*” by H.-B. Zeng et al. studies the absolute stability for a class of nonlinear singular systems with time delay. The paper entitled “*Analysis and design of*