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Graph theory-based adaptive intermittent synchronization for stochastic delayed complex networks with semi-Markov jump. (English) Zbl 1433.93145

Summary: This paper is concerned with exponential synchronization of semi-Markov jump complex networks via adaptive aperiodically intermittent control. Time-varying delay, stochastic perturbation, semi-Markov jump topology are all taken into consideration to make model more general. It should be pointed that, a semi-Markov jump adaptive aperiodically intermittent controller is designed as well. The synchronization analysis is carried out based on the combination of Lyapunov method and graph theory. Moreover, some novel synchronization criteria are established, which are closely related to the maximum uncontrolled ratio and the topological structure of considered networks. Furthermore, the obtained results are applied to stochastic coupled oscillators, and the corresponding numerical simulations are provided to illustrate the applicability and effectiveness of the proposed control strategy.

MSC:
93E15 Stochastic stability in control theory
34D06 Synchronization of solutions to ordinary differential equations
05C82 Small world graphs, complex networks (graph-theoretic aspects)
60K20 Applications of Markov renewal processes (reliability, queueing networks, etc.)
93A14 Decentralized systems
93E35 Stochastic learning and adaptive control
93E03 Stochastic systems in control theory (general)

Keywords:
adaptive aperiodically intermittent control; graph theory; semi-Markov jump; stochastic coupled oscillators; exponential synchronization

Full Text: DOI

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