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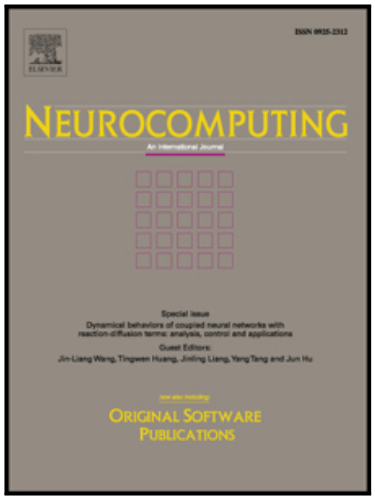

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Sampled-data synchronization control for Markovian delayed complex dynamical networks via a novel convex optimization method ☆

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Abstract

This paper investigates the problem of exponential synchronization for Markovian delayed complex dynamical networks (CDNs) via a sampled-data control scheme. First, a modified piecewise augmented Lyapunov-Krasovskii functional (LKF) is constructed, which can fully capture the system characteristics and the available information on the actual sampling pattern. In comparison with existing results, the constraint condition of the positive definition of the LKF is more relax, since we take the LKF as a whole to examine its positive definite instead of restricting each term of it to positive definite. Second, by developing a novel convex optimization method, improved criteria are derived. Third, based on a new inequality of the neuron activation function, the desired sampled-data controller is designed under a larger sampling interval. Finally, three numerical examples are provided to show the effectiveness and advantages of the proposed results.

Keywords:
Exponential synchronization, complex networks, Sampled-data control, Markovian jump, Novel convex optimization method

1. Introduction

Complex dynamical networks (CDNs) have provoked widespread interests since they are successfully applicable to describe many real world systems, such as World Wide Web, social networks, electrical power grids, and so on [1, 2, 7, 13–16]. As one of the most important collective behaviors, synchronization of CDNs has been extensively studied due to its potential applications in secure communication, harmonic

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