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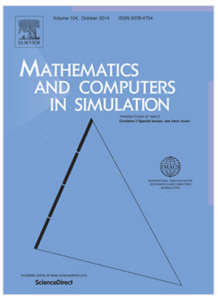

An event-triggered synchronization of semi-Markov jump neural networks with time-varying delays based on generalized free-weighting-matrix approach

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An event-triggered synchronization of semi-Markov jump neural networks with time-varying delays based on generalized free-weighting-matrix approach

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Abstract

In this paper, synchronization results for semi-Markovian jump neural networks with time-varying delays is investigated based on the event-triggered control scheme. With the construction of suitable Lyapunov-Krasovskii functional (LKF), novel synchronization criteria for delayed semi-Markovian jump neural networks are established in the form of linear matrix inequalities (LMIs). Rather, a general free-weighting matrix approach, which is proven to produce less conservative results than the existing methods, is employed to estimate the single integral term. The desired synchronization is achieved by solving the obtained set of LMIs. Eventually, numerical examples are proposed to show the validity of the proposed approach.

Keywords: Event-triggered control; Semi-Markov systems; Neural networks; Free-weight-matrix-based integral inequality.

1 Introduction

Neural networks imitate the functions of the human brain and it has attracted much attention in various applications including secure communication, image processing, pattern recognition, computational and combinatorial optimization etc. Because of the dynamical nature of these applications, the stability analysis of the designed networks has emerged as an important research topic in recent years. Practically, the communication transmission in a network is often disturbed by some external factors in many engineering and neural systems which may lead to undesirable dynamic behaviors such as oscillation and instability and thus there arises time-delay in the system [1, 2, 3, 4, 5, 6]. Moreover, since neural networks can exhibit chaotic and dynamic behavior, the synchronization control becomes a most significant application and hence many synchronization techniques were developed in the literature [7, 8, 9, 10, 11]. Therefore, the study of stability and