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Finite-time synchronization of uncertain coupled switched neural networks under asynchronous switching

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Abstract: This paper deals with the finite-time synchronization problem for a class of uncertain coupled switched neural networks under asynchronous switching. By constructing appropriate Lyapunov-like functionals and using the average dwell time technique, some sufficient criteria are derived to guarantee the finite-time synchronization of considered uncertain coupled switched neural networks. Meanwhile, the asynchronous switching feedback controller is designed to finite-time synchronize the concerned networks. Finally, two numerical examples are introduced to show the validity of the main results.

Keywords: finite-time synchronization; coupled switched neural networks; asynchronous switching; Lyapunov-like functional; average dwell time.

1 Introduction

As special issues of complex networks, coupled neural networks have attracted considerable attention and been intensively studied for their potential applications in many areas. Due to the finite switching speed of information processing and the inherent neutral communication, time delays always unavoidably emerge in neural networks, and may cause instability, significantly deteriorated performances, and some interesting dynamical phenomena such as periodic orbits, bifurcations and chaotic behaviors, and so on [1, 2, 3]. Moreover, parametric uncertainty is usually existent for the modeling inaccuracies or the changes of environment. Therefore, time delays and parametric uncertainties are essential to be considered in coupled neural networks models.

In real world, complex networks may be affected with jumping parameters, link failure and new link creation, and some other environmental changes, then the topology and node switching should be

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