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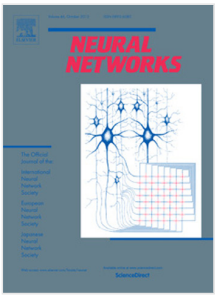

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Exponential Stabilization and Synchronization for Fuzzy Model of Memristive Neural Networks by Periodically Intermittent Control

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Abstract

The problem of exponential stabilization and synchronization for fuzzy model of memristive neural networks (MNNs) is investigated by using periodically intermittent control in this paper. Based on the knowledge of memristor and recurrent neural network, the model of MNNs is formulated. Some novel and useful stabilization criteria and synchronization conditions are then derived by using the Lyapunov functional and differential inequality techniques. It is worth noting that the methods used in this paper are also applied to fuzzy model for complex networks and general neural networks. Numerical simulations are also provided to verify the effectiveness of theoretical results.

Keywords: exponential stabilization; synchronization; fuzzy model of memristive neural networks (MNNs); intermittent control.

1. Introduction

Memristor was postulated by Chua as the fourth basic circuit element in 1971 [1], and realized by Williams's group in 2008 [2]. As a new circuit element, the memristor shares many properties of resistors and shares the same unit of measurement (ohm), and remembers information just as the neurons in human have. Because of this feature, memristors have been proposed to work as synaptic weights to build the models of neural networks to emulate the human brain, that is, memrsitor-based recurrent neural networks. In recent years, the memristor-based recurrent neural networks have been extensively investigated and successfully applied to signal processing, image processing, pattern classification, quadratic optimization, associative memory and so on [3, 4, 5, 6, 7, 8]. As we know, the memristor-based recurrent neural networks can remember its past dynamical history, store a continuous set of states [3]. It will open up new possibilities in the understanding

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