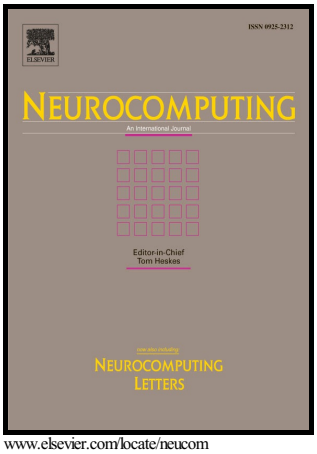

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Lian Duan, Zhenyuan Guo

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New results on periodic dynamics of memristor-based recurrent neural networks with time-varying delays *

Lian Duan[a,†], Zhenyuan Guo[b]

[a] School of Science, Anhui University of Science and Technology, Huainan, Anhui 232001, PR China

[b] College of Mathematics and Econometrics, Hunan University, Changsha, Hunan 410082, PR China

Abstract: In this brief, we study a class of memristor-based recurrent neural networks(MRNNs) with time-varying delays. Easily verifiable delay-independent criteria are established to ensure the existence and global exponential stability of periodic solutions by using novel analysis techniques, which not only improve but also complement some existing ones. These theoretical results are also supported with numerical simulations.

Keywords: Memristor-based recurrent neural network; Periodic solution; Global exponential stability.

1. Introduction

In this brief, we consider a class of non-autonomous memristor-based recurrent neural networks with time-varying delays, which is described by the following differential equations:

$$\frac{\mathrm{d}x_i(t)}{\mathrm{d}t} = - d_i(t)x_i(t) + \sum_{j=1}^{n} a_{ij}(x(t))g_j(x_j(t)) + \sum_{j=1}^{n} b_{ij}(x(t))g_j(x_j(t-\tau_{ij}(t))) + I_i(t), \qquad (1.1)$$

in which $n \geq 2$ denotes the number of neurons in the neural network, $x_i(t)$ corresponds to the voltage of the capacitor C_i, $d_i(t) > 0$ represents the neuron self-inhibitions, $\tau_{ij}(t)$ denotes the transmission delay of the ith neuron along the axon of the jth neuron and satisfies $0 \leq \tau_{ij}(t) \leq \tau$, g_j denotes the activation function of signal transmission, $I_i(t)$ denotes the external bias on the

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† Corresponding author. Tel./fax: +86 13865542731.

E-mail: lianduan0906@163.com (L. Duan), zyguo@hnu.edu.cn(Z. Guo).