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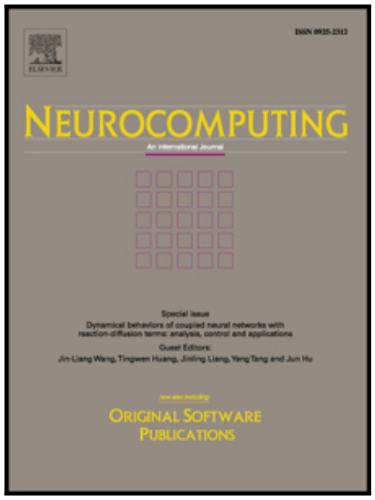

Improved criteria of delay-dependent stability for discrete-time neural networks with leakage delay

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Improved criteria of delay-dependent stability for discrete-time neural networks with leakage delay ☆

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Abstract

This paper is concerned with the stability analysis of discrete-time neural networks with leakage and time-varying delays. By a novel summation inequality, the technique of reciprocally convex combination and triple Lyapunov-Krasovskii terms, the various cases of time-delay are discussed in detail and improved criteria are established to ensure the delay-dependent stability of discrete-time neural networks. Finally, three examples are given to verify the effectiveness of the proposed methods.

Keywords: Discrete-time neural networks; Leakage delay; Summation inequality; Time-varying delays; Uncertainty.

1. Introduction

Over the past few decades, many researchers have paid much attention to neural networks because of its wide application in image processing, signal processing, fault diagnosis, pattern recognition, combinatorial optimization, associative memory and so on. A series of dynamic behaviors such as stability, instability, periodic oscillation and chaos have a great influence on neural networks. In view of these, many important results had been reported in the literature, see [3, 10, 21, 25, 26, 28, 33, 35] and the references therein.

It is worth mentioning that most of neural networks are concerned with continuous-time systems, however, the discrete-time neural networks are more important than the continuous-time counterparts in practical applications such as bidirectional associative memory, nonlinear output regulation and adaptive tracking, [2, 11, 17, 18, 23]. Moreover, simulation or computation is essential for continuous-time neural networks. So it is necessary to discretize continuous-time neural networks to formulate discrete-time systems. Therefore,

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