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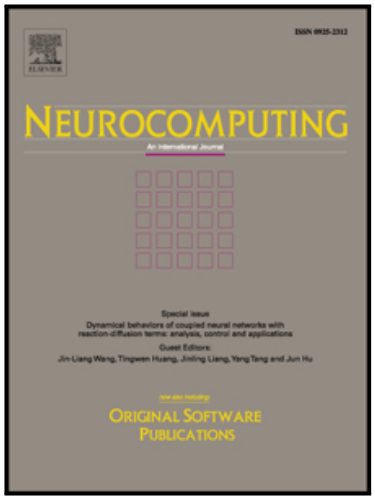

Distributed-delay-dependent exponential stability of impulsive neural networks with inertial term

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Distributed-delay-dependent exponential stability of impulsive neural networks with inertial term

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Abstract

Global exponential stability problem of impulsive inertial neural networks with time-varying discrete-delay and distributed-delay is considered in the present paper. Lyapunov-Krasovskii functional and differential inequality for delay differential equations are employed to investigate the stability of the inertial neural networks. The distributed-delay-dependent stability criteria are obtained in terms of linear matrix inequalities and algebraic inequalities. The novel results complement and extend the works on inertial neural network with/without impulsive effects. Finally, typical numerical examples are given to illustrate the validity of the theoretical results.

Keywords: Global exponential stability; Inertial neural networks; Distributed-delay; Impulsive effects.

1. Introduction

In the past decades, the dynamical characteristics of various neural networks, including Hopfield neural networks [1, 2], cellular neural networks [3], BAM neural networks [4, 5], Cohen-Grossber neural networks [6, 7] have been widely investigated due to their extensively applications in the real world, such as face detection [8], signal processing [9], associative memory [10], and so on. For instance, if a neural network is applied to associative memory model, it is highly desire to ask whether the neural network has a stable steady which indicates that the information being sent back and forth does not change after a few iterances.

As well known, time delays frequently appear in real applications, such as information transformation, communication, biological systems, and the existence of time delays may cause the poor performance [11, 12, 13, 14, 15, 16, 17, 18, 19]. As a special case of various time delays, distributed delay often occurs in real systems [20]. For instance, some authors concluded that the adoption of distributed delay in biology can get the model more tractable and more realistic than those with discrete-delays [21]. As a consequence, it is necessary and significant to investigate the stability problem of the neural networks with distributed-delays, including finite and infinite distributed-delays

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