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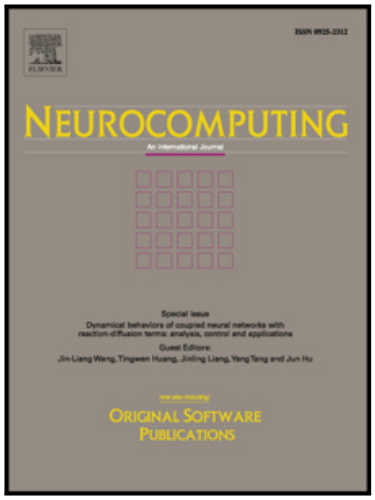

On anti-periodic solutions for neutral shunting inhibitory cellular neural networks with time-varying delays and D operator

Changjin Xu, Peiluan Li

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ACCEPTED MANUSCRIPT

On anti-periodic solutions for neutral shunting inhibitory cellular neural networks with time-varying delays and D operator *

Changjin Xu[1], Peiluan Li[2]

[1] Guizhou Key Laboratory of Economics System Simulation
Guizhou University of Finance and Economics, Guiyang 550004, PR China

[2] School of Mathematics and Statistics, Henan University of Science and Technology
Luoyang 471023, PR China

Abstract: This paper deals with a class of neutral shunting inhibitory cellular neural networks with time-varying delays and D operator. Using the differential inequality theory and Lyaunov functional method, a set of sufficient conditions which ascertain that the existence and exponential stability of anti-periodic solutions of neutral shunting inhibitory cellular neural networks with time-varying delays and D operator are derived. Computer simulations are delineated to substantiate the correctness of our theoretical predictions. The obtained results of this paper are new and complement some earlier works.

Keywords: Neutral shunting inhibitory cellular neural networks; Anti-periodic solution; Exponential stability; D operator; Time-varying delays

Mathematics Subject Classification 2000: 34C25; 34K13; 34K25

1. Introduction

Shunting inhibitory cellular neural networks (SICNNs) were introduced by Bouzerdoum and Pinter [33]. The important property of SICNNs lies in the differential response to stimuli moving in opposite directions. Some studies reveal that this directional response adapts to mean luminance levels and changes with size and speed of moving objects and coupling order among elements of the networks [33]. It is well known that SICNNs play a vital role in wide world of science such as adaptive pattern recognition, psychophysics, image processing perception, speech, robotics, vision, etc. [1-3]. Delays usually inevitably appear in the signal transmission among the neurons of neural networks due to the finite switching speed of information processing and the inherent communication time of neurons. Thus numerous scholars focus on the dynamics of SICNNs with delays and some excellent achievements on SICNNs with delays have been reported. For instance, Liu [4] considered the convergence behavior of solutions of SICNNs with unbounded delays and time-varying coefficients, Fen and Fen [5] studied the SICNNs with Li-Yorke chaotic outputs on a time scale, Peng and Wang [6] analyzed the anti-periodic solutions for SICNNs with time-varying delays in

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