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EXISTENCE AND GLOBAL EXPONENTIAL STABILITY OF PERIODIC SOLUTIONS TO BAM NEURAL NETWORKS WITH PERIODIC COEFFICIENTS AND DISTRIBUTED DELAYS ¹

Xiaoyan $Lin^{1,2}$ and X. H. $Tang^2$

¹ Department of Mathematics, Huaihua College, Huaihua, Hunan 418008, P.R.China
² School of Mathematical Sciences and Computing Technology, Central South University, Changsha, Hunan 410083, P.R.China E-mail: xiaoyanlin98@hotmail.com

Abstract. By using the continuation theorem of coincidence degree theory and Non-Liapunov method, we obtain some new and simple criteria to ensure the existence and global exponential stability of periodic solution to the bidirectional associative memory (BAM) neural networks with periodic coefficients and distributed delays. These results greatly improve and generalize the almost corresponding works in the earlier papers.

Keywords. BAM neural networks, periodic solution, global exponential stability, distributed delays.

AMS (MOS) subject classification: 34K20; 34K13; 92B20.

1. Introduction

In this paper, we investigated the BAM neural networks with periodic coefficients and continuously distributed delays modelled by the following system:

$$\begin{cases} x'_{1i}(t) = -a_{1i}(t)x_{1i}(t) + \sum_{j=1}^{m} w_{2ji}(t)f_{2j} \left(\int_{0}^{+\infty} g_{2j}(s)x_{2j}(t-s)ds\right) \\ +I_{1i}(t), \\ x'_{2j}(t) = -a_{2j}(t)x_{2j}(t) + \sum_{i=1}^{m} w_{1ij}(t)f_{1i} \left(\int_{0}^{+\infty} g_{1i}(s)x_{1i}(t-s)ds\right) \\ +I_{2j}(t), \end{cases}$$

$$(1.1)$$

where i = 1, 2, ..., n; j = 1, 2, ..., m. BAM neural network was first introduced by Kosto [6, 7]. It is composed of neurons arranged in two layers, the X-layer and the Y-layer. Due to the BAM neural networks has been used in many fields such as image processing, pattern recognition, and automatic control [8]. Therefore, the BAM neural networks have attracted great attention of many researchers [1, 2, 4-17]. There are many studying results about the BAM neural networks with and without axonal signal transmission delays

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