Dynamics of Continuous, Discrete and Impulsive Systems
Series **B:** *Applications & Algorithms* **13 (2006)** 297-308

SYNCHRONIZATION OF A CLASS OF DELAYED CHAOTIC NEURAL NETWORKS WITH FULLY UNKNOWN PARAMETERS[1]

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Abstract. This paper presents a global asymptotic synchronization scheme for a class of delayed chaotic neural networks when the parameters of the drive system are fully unknown and different from those of the response system. Using the Lyapunov stability theory and the inverse optimal control approach, an adaptive synchronization controller is proposed to guarantee the global asymptotic synchronization of state trajectories for two delayed chaotic neural networks with fully unknown parameters. The present controller can easily be implemented in practice. An illustrative example is used to demonstrate the effectiveness of the present method.

Keywords. Delayed chaotic neural networks; unknown parameters; synchronization; inverse optimal control; Lyapunov theory

AMS (MOS) subject classification: 0545 TP273

1 Introduction

Over the last decades, synchronization of chaotic systems has been intensively investigated by many researchers. Since chaos synchronization has potential applications in several areas such as secure communication [1–3], chemical reactions, biological systems, information science, etc., many different chaos synchronization strategies have been developed, including drive-response control [4], coupling control [5], variable structure control [6], adaptive control [7], impulsive control [8, 9], active control [10–12]. Nevertheless, in the aforementioned methods and many other existing synchronization methods, one major difficulty seems to be caused by the requirement

[1]Note from the Editors-in-Chief: Due to some miscommunications between the authors and the journal, the publication of the paper by H. Zhang, *et al.*, entitled: "Chaotification of fuzzy hyperbolic model: An adaptive inverse optimal control approach," *Dynamics of Continuous, Discrete & Impulsive Systems, Series B: Applications & Algorithms*, vol. 11a, supplementary issue, pp. 45–52, Dec. 2004, was not intended. Instead, the present paper should have been published in the 2004 supplementary issue.