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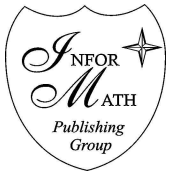

A New Synchronization Scheme for General 3D Quadratic Chaotic Systems in Discrete-Time

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Abstract: In this paper, a new general chaos synchronization scheme is proposed for coupled arbitrary 3-D quadratic chaotic dynamical systems in discrete-time. The proposed synchronization method, based on nonlinear controllers and Lyapunov stability theory, is theoretically rigorous. The derived synchronization criterion can be also applicable to a large class of discrete-time chaotic systems. Our control scheme is used to illustrate complete synchronization between the three-dimensional hyperchaotic discrete-time Rössler and Wang systems. Moreover numerical simulations are used to show the effectiveness and the feasibility of the proposed synchronization scheme.

Keywords: *quadratic systems; chaos synchronization; control scheme; discrete-time; Lyapunov stability.*

Mathematics Subject Classification (2010): 93C10, 93C55, 93D05.

1 Introduction

Over the last two decade, many scholars have proposed various control schemes in chaos synchronization [1–6], but the most of works have concentrated on continuous-time rather than discrete-time chaotic systems. In practice, discrete-time chaotic systems play a more important role than their continuous counterparts [7]. In fact, many mathematical models of physical processes [8], biological phenomena [10], chemical reactions [9] and economic systems [11] were defined using discrete-time chaotic systems. Many 3D chaotic and hyperchaotic dynamical systems in discrete-time are founded such as Baier-Klain map [12], Hitzl-Zele map [13], Stefanski map [14], Wang system [15], discrete-time Rössler system [16] and Grassi-Miller map [18], etc.

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