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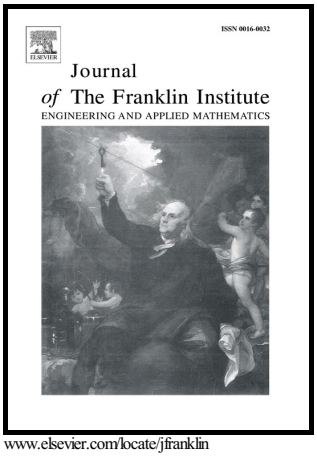

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PII: S0016-0032(16)00060-0
DOI: http://dx.doi.org/10.1016/j.jfranklin.2016.02.006
Reference: FI2536

To appear in: *Journal of the Franklin Institute*

Received date: 12 March 2015
Revised date: 15 December 2015
Accepted date: 7 February 2016

Cite this article as: Song Zheng, Synchronization analysis of time delay complex variable chaotic systems with discontinuous coupling, *Journal of the Frankli Institute,* http://dx.doi.org/10.1016/j.jfranklin.2016.02.006

Synchronization analysis of time delay complex-variable chaotic systems with discontinuous coupling

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Abstract: In this paper, the synchronization problem between two complex-variable delayed chaotic systems with discontinuous coupling is analyzed, where the interactions between two systems are considered as on-off coupling. Based on the stability theory and comparison theorem of differential equations, some sufficient conditions are given to ensure synchronization in the complex-variable delayed chaotic systems with on-off coupling. The theoretical results show that two complex-variable delayed chaotic systems can achieve synchronization even if the two complex-variable delayed chaotic systems are switched off sometimes and the synchronization speed is closely related to the coupling strength and the on-off rate. Finally, numerical examples are examined to illustrate the feasibility and effectiveness of the analytical results.

Keywords: Delayed chaotic system; Complex; Synchronization; Discontinuous coupling

1. Introduction

In the last few decades, chaos research has increasingly become an important topic in nonlinear science. Chaos synchronization has also obtained much attention due to its potential application [1-5] to physics, secure communication, informatics, chemical reactions, etc. Since Pecora and Carroll [6] introduced a method to synchronize two identical chaotic systems with different initial conditions in 1990, various control schemes have been proposed for the synchronization of chaotic systems with active control [7], adaptive design method [8], backstepping design technique [9], time delay feedback control [10], sliding mode control [11], impulsive control [12] and so on. Meanwhile, different kinds of synchronization have been proposed in dynamical systems such as complete synchronization [13], generalized synchronization [14], phase synchronization [15], projective synchronization [16],