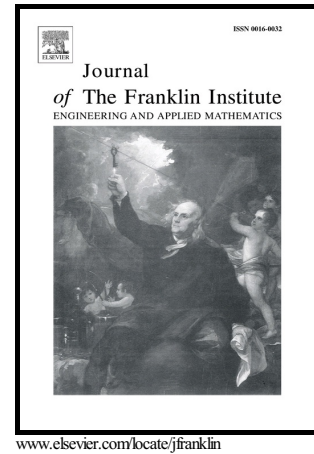


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# Synchronization analysis of time delay complex-variable chaotic systems with discontinuous coupling

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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],

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