REDUCED ORDER MULTI SWITCHING HYBRID SYNCHRONIZATION OF CHAOTIC SYSTEMS

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Abstract. In this article, a new synchronization scheme is presented by combining the concept of reduced-order synchronization with multi-switching synchronization schemes. The presented scheme, reduced-order multi-switching hybrid synchronization, is notable addition to the earlier multi-switching schemes providing enhanced security in applications of secure communication. Based on the Lyapunov stability theory, the active control method is used to design the controllers and derive sufficient condition for achieving reduced-order multi-switching hybrid synchronization between a new hyperchaotic system taken as drive system and Qi chaotic system serving as response system. Numerical simulations are performed in MATLAB using the Runge-Kutta method to verify the effectiveness of the proposed method. The results show the utility and suitability of the active control method for achieving the reduced-order multi-switching hybrid synchronization among dynamical chaotic systems.

Keywords: chaos synchronization; reduced order synchronization; multi-switching synchronization; hybrid synchronization; active control method.

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1. Introduction

Synchronization of chaos refers to a process in which two or more chaotic systems (either identical or non-identical) adjust a given property of their motion to a common behaviour. Until 1990, it was considered impractical due to the well-known divergence of trajectories caused by

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