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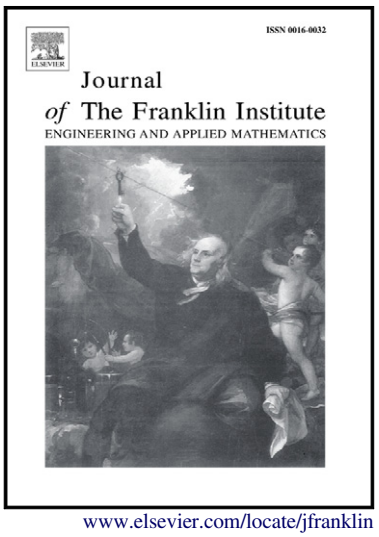

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Outer Synchronization of Partially Coupled Dynamical Networks via Pinning Impulsive Controllers

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Abstract

This paper presents an analytical study of outer synchronization of partially coupled dynamical networks via pinning impulsive controller. At first, more realistic drive-response partially coupled networks are established. Then, based on the regrouping method, some efficient and less conservative synchronization criteria are derived and developed in terms of average impulsive interval. Our results show that, by impulsively controlling a crucial fraction of nodes in the response network, the outer synchronization can be achieved. Finally, illustrated examples are given to verify the effectiveness of the proposed strategy.

Keywords: Complex dynamical networks; Partial coupling; Outer synchronization; Pinning impulsive control; Average impulsive interval.

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1 INTRODUCTION

Complex dynamical networks typically consist of a large set of interconnected dynamical nodes, in which each node is a fundamental unit with detailed contents [1,2]. A large number of systems including naturally occurring networks and man-made networks can be modeled by complex networks, which are shown to widely exist in our daily life, such as food webs, communication networks, the Internet, the World Wide Web, and social organizations, etc. [3–6].

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