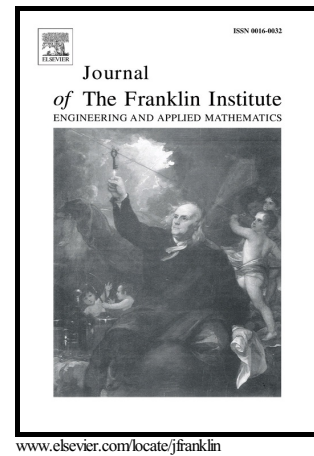


Secure Communications via Synchronization of
Liouvillian Chaotic Systems

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Abstract

In this article we propose the use of a Liouvillian chaotic system on a master-slave scheme for secure communications. Two forms of data encryption are presented, the first is a state observer based on the Super-Twisting algorithm, the second is a receiver designed through the properties of Liouvillian systems, this last receiver does not suffer from data loss due to synchronization error present on state observer based encryption. To test the advantages of this encryption, images and text will be used as transmitted data.

Keywords: Synchronization; Chaotic systems; Secure communications

1. Introduction

The problem of synchronization in chaotic systems has received a great attention among scientist in many fields due to its potential applications [8], [16], one of the most important applications is secure communications where a predominant technique is chaotic masking [4], [9], [12], [14]; but also chaotic system alone have been used in secure communications [1], [2] and as random number generator due to its properties [6], also chaotic systems are present in other areas in the literature [5], [7]. In the last decade, many different approaches related to chaos synchronization have been applied, where the goal is to design an observer to achieve synchronization to nonlinear electric circuit oscillators [13].

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