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Synchronization of the Restricted Charged Three-Body Problem

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Abstract: This paper deals with the chaos and synchronization behavior of two identical nonlinear dynamical systems of the restricted charged three-body problem. An active control technique is introduced to achieve synchronization between the drive and response systems. Also, an error dynamical system of the drive and response systems has been investigated using active control inputs. Secondly, the Lyapunov theorem on stability and the Routh-Hurwitz criteria have been taken into account for the study of stability of the error dynamical system. Further, a six degree coefficient matrix of the error dynamical system has been investigated. We have concluded by the Lyapunov stability criteria, the error dynamical system is stable. Numerical simulation is taken into account to check the effectiveness of the proposed active control technique.

Keywords: *restricted charged three-body problem; synchronization; Lyapunov stability; Routh-Hurwitz criteria*

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1 Introduction

The basic theory of chaos and synchronization has a very powerful application in the real world. There are various dynamical systems which have real life applications. There is an opportunity of doing well research and obtaining some new information about real life from the study of the solar dynamical system. There are many forces acting between the celestial bodies of a solar dynamical system. There exist many perturbations such as radiation pressure, oblateness, the Coriolis and centrifugal forces and drag force between the solar system bodies. These perturbations can make new contributions in the study

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