



Different Types of Synchronization Between Different Fractional Order Chaotic Systems

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Abstract: In this paper complete synchronization, anti-synchronization and projective synchronization are achieved between two different fractional order chaotic systems, fractional order Lotka Volterra system and fractional order Lu system, via active control method. Numerical simulations have been done in Matlab by using Grunwald Letnikov method. Numerical results demonstrate the effectiveness and feasibility of the proposed control techniques.

Keywords: *synchronization; anti-synchronization; projective synchronization; fractional order chaotic systems; active control*

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1 Introduction

A chaotic dynamical system is defined as the system which satisfies the properties of boundedness, infinite recurrence and sensitive dependence on initial conditions [2]. Chaos theory investigates the unstable behavior in deterministic nonlinear dynamical systems which cause 'chaos'. Sometimes chaotic behavior of a dynamical system is found useful like in secure communications [21, 37]. First time in 1963, Lorenz discovered a three dimensional chaotic system while studying weather model for atmospheric convection. After a decade, Rossler discovered a three dimensional chaotic system, which was constructed during the study of a chemical reaction. Synchronization is an important and famous phenomenon which can be understood within the unifying framework of the non-linear sciences. Due to its potential applications in the field of nonlinear dynamics it has been hot topic of research. Since the pioneer work of Pecora and Carroll [26] it has been

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