Adaptive control with two controllers of the Lu’s system

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Abstract
In this paper, we study Lu’s system, and we study the stability of equilibrium point of Lu’s system. Then, we control the chaotic behavior of Lu’s system to its equilibrium point using Adaptive Control with two controllers method.

Keywords and phrases: Lu’s system, adaptive Control with two controllers.

1. Introduction
Chaos in control systems and controlling chaos in dynamical systems have both attracted increasing attention in recent years. A chaotic system has complex dynamical behaviors that possess some special features, such as being extremely sensitive to tiny variations of initial conditions, having bounded trajectories in the phase space. Controlling chaos has focused on the nonlinear systems such as a Lu’s system.

Lu’s system was first introduced in [2] which is described by

\[ \begin{align*}
\dot{x} &= a(y-x), \\
\dot{y} &= -xz + cy, \\
\dot{z} &= xy - bz,
\end{align*} \]  

(1)

where \( x, y, z \) are state variables, \( a, b, c \) are positive constants.

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