Alternative implementation of the chaotic Chen－Lee system

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Abstract

The chaotic Chen－Lee system was developed with a formalism based on the Euler equations for the motion of a rigid body. It was proved that this system is the governing set of equations for gyro motion with feedback control. Recently, studies were conducted to explore the dynamic behavior of this system, including fractional order behavior, the generation of hyperchaos and perturbation analysis, control and anti-control of chaos, synchronization,etc. In this study, we further explore (1) the stability of the equilibrium points and (2) the implementation of an electronic circuit using the Chen－Lee system. It is shown that not only is this system related to gyro motion but can also be applied to electronic circuits for encryption purposes.

Keyword：fractional order, Chen-Lee system, electric circuits