

# Chaos in Newton–Leipnik system with a fractional order

許隆結, , Tam Lap Mou,  
Mechanical Engineering  
Engineering

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## Abstract

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The dynamics of fractional-order systems has attracted increasing attention in recent years. In this paper, the dynamics of the Newton–Leipnik system with fractional order was studied numerically. The system displays many interesting dynamic behaviors, such as fixed points, periodic motions, chaotic motions, and transient chaos. It was found that chaos exists in the fractional-order system with order less than 3. In this study, the lowest order for this system to yield chaos is 2.82. A period-doubling route to chaos in the fractional-order system was also found.

Keyword : Newton–Leipnik system  
fractional-order dynamics