

Chaos Suppression Control of a Vibration Isolation System with Magneto-rheological Damper

Hailong Zhang¹, Dong Guo¹, Enrong Wang¹, Subhash Rakheja², and Chun-Yi Su³

¹Nanjing Normal University School of Electrical and Automation Engineering

²Concordia University

³South China University of Technology Key Laboratory of Autonomous Systems and Network Control Ministry of Education

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Abstract

A two degree-of-freedom vibration isolation system with magneto-rheological damper (MRVIS) is analyzed. Under the harmonic excitation, the nonlinear behaviors are discovered. With the excitation frequency increased, the period-doubling bifurcation and saddle node bifurcation, route to chaos are found. Then, the system returns to steady state through the route out of chaos, with inverse period-doubling bifurcation. Furthermore, a sliding mode controller through tracking the error between actual and ideal state system, is proposed to suppress the increasing amplitude of the system caused by the chaos. Both the calculation and experiment show that the chaotic motion is effectively repressed.

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