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Controlling of stochastic resonance and noise enhanced stability induced by harmonic noises in a bistable system

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Abstract

Stochastic resonance (SR) and noise enhanced stability (NES) in a bistable system driven by an additive harmonic noise and a multiplicative harmonic noise is investigated. Through numerical simulation, we obtained the power spectrum by the Fourier transformation on time series. The results indicate that (i) for certain values of the parameters of additive harmonic noise Γ , Ω and the noise intensity D , the SR phenomenon occurs. It means we can control the SR phenomenon by modulating the parameters of harmonic noise; (ii) the NES phenomenon occurs at certain values of the parameters of multiplicative harmonic noise Γ , Ω and the multiplicative noise intensity Q . Most important, the NES phenomenon can also be controlled by modulating the parameters of harmonic noise.

Key words: harmonic noise; stochastic resonance; bistable system

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1 Introduction

In recent years, the concept of stochastic resonance (SR) was firstly put forward by Benzi et al.[1]. After that, the SR phenomenon has been ex-

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