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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  $\Gamma$ ,  $\Omega$  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  $\Gamma$ ,  $\Omega$  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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