

Enhancement of stability in systems with metastable states

Bernardo Spagnolo, G. Augello, A. Fiasconaro, N. Pizzolato and D. Valenti

*Dipartimento di Fisica e Tecnologie Relative, Universita' di Palermo
CNISM-INFN, Unita' di Palermo and Group of Interdisciplinary Physics
Viale delle Scienze, pad.18 I-90128 Palermo, Italy
spagnolo@unipa.it*

The investigation of noise-induced phenomena in far from equilibrium systems is one of the approach used to understand the behaviour of physical and biological complex systems. Metastability is a generic feature of many nonlinear systems, and the problem of the lifetime of metastable states involves fundamental aspects of nonequilibrium statistical mechanics. The enhancement of the lifetime of metastable states through the noise enhanced stability effect and the role played by the resonant activation phenomenon will be discussed in models of interdisciplinary physics: (i) dynamics of an overdamped Josephson junction; (ii) transient regime of the noisy FitzHugh-Nagumo model; (iii) population dynamics and polymer dynamics, and (iv) a market model with stochastic volatility.

References

1. A. Fiasconaro, B. Spagnolo, A. Ochab-Marcinek and E. Gudowska-Nowak, *Co-occurrence of resonant activation and noise-enhanced stability in a model of cancer growth in the presence of immune response*, Phys. Rev. E **74**, 041904(10) (2006).
2. G. Bonanno, D. Valenti and B. Spagnolo, *Mean escape time in a system with stochastic volatility*, Phys. Rev. E **75**, 016106(8) (2007).
3. B. Spagnolo, A. A. Dubkov, A. L. Pankratov, E. V. Pankratova, A. Fiasconaro, A. Ochab-Marcinek *Lifetime of metastable states and suppression of noise in interdisciplinary physical models*, Acta Physica Polonica B **38**, 1925-1950 (2007).