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Asymptotic transition times and metastability for a SPDE with heavy tailed noise for small intensity

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Abstract

In [Dit99a] and [Dit99b], Ditlevsen analized large data sets found in Greenland ice cores, that describe the paleoclimatic temperature evolution. In order to understand the statistics of the times series on a conceptual level, he proposed a model of a particle moving in a double well potential driven by heavy tailed noise.

For simple SDE models of that type Imkeller and Pavlyukevich investigated the asymptotics of exit and transition times for vanishing noise intensity rigorously in [IP06a], [IP06b] and [IP06c]. In contrast to the Wiener case, for which exponential growth is observed [FW98], these models show polynomial growth rates.

This talk will be concerned with a generalization of this concept to a SPDE case with polynomial potential with heavy tailed noise. After a heuristic motivation and a discussion about arising problems, the asymptotic exit and transition times as well as metastability for vanishing noise will be presented.

[Dit99a] P. D. DITLEVSEN, Observation of astable noise induced millennial climate changes from an ice-core record. Geophysical Research Letters, Volume 26, Issue 10, p. 1441-1444, 1999

[Dit99b] P. D. DITLEVSEN, Anomalous jumping in a double-well potential. Physical Review E, 60(1): 172-179, 1999

[FW98] M. FREIDLIN AND A. WENTZELL, Random perturbations of dynamical systems. Springer, 1998.

[IP06a] P. IMKELLER AND I. PAVLYUKEVICH, First exit times of SDEs driven by stable Lévy processes. Stochastic Processes and their Applications 116 (4), 611–642, 2006

[IP06b] P. IMKELLER AND I. PAVLYUKEVICH, Lévy Flights: Transitions and Meta-Stability. Journal of Physics A: Mathematical and General 39, L237–L246, 2006

[IP06c] P. IMKELLER AND I. PAVLYUKEVICH, Metastable behaviour of small noise Lévy-driven diffusions. arXiv math.PR/0601771, 2006