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Semiclassical analysis and a new result for Poisson-Lévy excursion measures. (English)

Zbl 1197.60051
Electron. J. Probab. 13, 1283-1306 (2008).

Summary: The Poisson-Lévy excursion measure for the diffusion process with small noise satisfying the Itô equation

$$dX^{\varepsilon} = b(X^{\varepsilon}(t))\,dt + \sqrt{\varepsilon}\,dB(t)$$

is studied and the asymptotic behaviour in ε is investigated. The leading order term is obtained exactly and it is shown that at an equilibrium point there are only two possible forms for this term – Lévy or Hawkes-Truman. We also compute the next to leading order term and demonstrate the remarkable fact that it is identically zero.

MSC:

60H10 Stochastic ordinary differential equations (aspects of stochastic analysis)
41A60 Asymptotic approximations, asymptotic expansions (steepest descent, etc.)
60J75 Jump processes (MSC2010)

Keywords:

excursion measures; asymptotic expansions