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**Ornstein-Uhlenbeck-Cauchy process.** (English) Zbl 1056.82009

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Summary: We combine earlier investigations of linear systems subject to Lévy fluctuations with recent attempts to give meaning to so-called Lévy flights in external force fields. We give a complete construction of the Ornstein-Uhlenbeck-Cauchy process as a fully computable paradigm example of Doob's stable noise-supported Ornstein-Uhlenbeck process. Despite the nonexistence of all moments, we determine local characteristics (forward drift) of the process, generators of forward and backward dynamics, and relevant (pseudodifferential) evolution equations. The induced nonstationary spatial process is proved to be Markovian and quite apart from its inherent discontinuity defines an associated velocity process in a probabilistic sense.

**MSC:**

- [82C31](#) Stochastic methods (Fokker-Planck, Langevin, etc.) applied to problems in time-dependent statistical mechanics
- [60G52](#) Stable stochastic processes
- [60H10](#) Stochastic ordinary differential equations (aspects of stochastic analysis)
- [60J25](#) Continuous-time Markov processes on general state spaces

Cited in **13** Documents

**Full Text:** [DOI](#) [arXiv](#)

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