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Introductory lectures on fluctuations of Lévy processes with applications. (English)

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Universitext. Berlin: Springer (ISBN 3-540-31342-7/pbk; 978-3-540-31343-4/ebook). xiii, 373 p. (2006).

This book is developed from a series of lectures given at Utrecht university in the Netherlands. It is written in a rather informal, conversational style. It is not intended as a work of reference, but as a homage to the many applications of Lévy processes: renewal, queueing, storage, and risk theory. It follows that emphasis is on path properties. The book has the following chapters. 1. Lévy processes and applications, 2. The Lévy-Itô decomposition and path structure, 3. More distributional and path-related properties, 4. General storage problems and paths of bounded variation, 5. Subordinators at first passage and renewal measures, 6. The Wiener-Hopf factorization, 7. Lévy processes at first passage and insurance risk, 8. Exit problems for spectrally negative processes, 9. Applications to optimal stopping problems, 10. Continuous-state branching processes. Definitions of such notions as stopping time and σ -finite are sometimes given 'on the fly'. This circumstance makes the text a bit crumbly. Not an easy book to teach out of; it would take good knowledge of the subject matter to make a suitable choice. Each chapter is followed by a set of exercises, which range from simple questions in analysis to deeper problems on stopping times. Solutions are given as a kind of appendix. All in all an interesting book. I have a few comments on the list of references. The classical book by Gnedenko and Kolmogorov is not mentioned, neither is the last major breakthrough in infinite divisibility by Lennart Bondesson. The somewhat out-dated thesis by the reviewer (1970) was better replaced by the recent book by Van Harn and himself from 2004, which also contains number of applications mentioned in the book under consideration.

Reviewer: [F. W. Steutel \(Eindhoven\)](#)

MSC:

- [60-02](#) Research exposition (monographs, survey articles) pertaining to probability theory
- [60G50](#) Sums of independent random variables; random walks
- [60G51](#) Processes with independent increments; Lévy processes
- [60G52](#) Stable stochastic processes

Cited in **2** Reviews
Cited in **422** Documents

Keywords:

[infinite divisibility](#); [sample path](#)

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