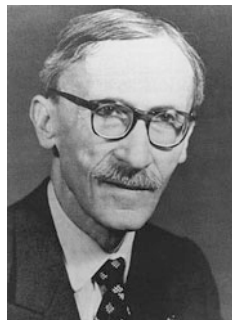


Preface



This second volume of the series “Lévy Matters” consists of two surveys of two topical areas, namely Fractional Lévy Fields by Serge Cohen and the Theory of Scale Functions for Spectrally Negative Lévy Processes by Alexey Kuznetsov, Andreas Kyprianou and Victor Rivero.

Roughly speaking, irregularity is a crucial aspect of random phenomena that appears in many different contexts. An important issue in this direction is to offer tractable mathematical models that encompass the variety of observed behaviours in applications. Fractional Lévy fields are constructed by integration of Lévy random measures; somehow they interpolate between Gaussian and stable random fields. They exhibit a number of interesting features including local asymptotic self-similarity and multi-fractional aspects. Calibration techniques and simulation of fractional Lévy fields constitute important elements for many applications.

A real-valued Lévy process is spectrally negative when it has no positive jumps. In this situation, the distribution of several variables related to the first exit-time from a bounded interval can be specified in terms of the so-called scale functions; the latter also play a fundamental role in other aspects of the theory. Scale functions are characterized by their Laplace transform, but in general no explicit formula is known, and therefore it is crucial in many applications to gather information about their asymptotic behaviour and regularity and to provide efficient numerical methods to compute them.

Aarhus, Denmark
Zürich, Switzerland
Paris, France
Munich, Germany

Ole E. Barndorff-Nielsen
Jean Bertoin
Jean Jacod
Claudia Küppelberg

Lévy Matters II

Recent Progress in Theory and Applications: Fractional
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Cohen, S.; Kuznetsov, A.; Kyprianou, A.E.; Rivero, V.

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