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Cont, Rama & Peter Tankov, *Financial Modelling With Jump Processes.* Chapman & Hall/CRC Financial Mathematics Series, Boca Raton 2004, xvi, 535 pp., £48.99, ISBN 1-5848-8413-4.

The last decade has seen many book publications in the quickly expanding area of mathematical finance. Many of them were university text-books or monographs which were written for a professional audience; almost all treated option pricing models where the underlying stock price is a diffusion with continuous trajectories. The book by Cont and Tankov is one of the first texts which is entirely devoted to option pricing with non-continuous jump-type stochastic processes.

Roughly speaking, continuous stock-price models refer to complete market situations, whereas jump-type processes represent imperfect or incomplete markets, for example, distorted by unequal information. This more realistic approach comes at a price: jump-type models tend to be less tractable and mathematically more challenging. Even worse, the universes of diffusion processes and jump processes are far apart in both techniques and ideas. The aim of the authors is to address this problem and to introduce the reader to the principal ideas, problems and models of option pricing with jump processes. Rather than striving for the most general (and technically most difficult) models driven by semimartingales, the authors decided to concentrate on Lévy noises and, in particular, jump-diffusions (i.e., Brownian motion with Poisson shocks) and stable processes. This allows an easy-going presentation where the basic problems of jump models are not additionally obscured by technicalities.

Ideally, the reader of this book is already familiar with mathematical finance; otherwise the opening chapter of the book would be rather off-putting. The main text is divided into four parts: *Mathematical tools* (pages 17–168), *Simulation and estimation* (pages 169–244), *Option pricing in models with jumps* (pages 245–450) and *Beyond Lévy processes* (pages 451–498). The 'Tools' section consists of a brief introduction to Lévy processes, with special emphasis on Poisson processes, the construction of Lévy processes by using Poisson point processes and on methods to change Lévy processes by means of various transformations, e.g., Bochner's subordination or changes of the Lévy measure. A slight deviation from the canonical choice of topics is the chapter on Lévy copulas which appears here for the first time in a book.

Part II contains a nicely written survey on simulation methods of Lévy distributions with complete algorithms, but without proofs. The theoretical foundations of Lévy processes are further explored in part III with an introduction to stochastic calculus for Lévy processes. The presentation follows the approach of Protter (2004) but at a gentler pace: Itô's formula, for instance, is presented in various degrees of sophistication, starting from jump-diffusions to general Lévy processes and, then, semimartingales (no proof for the last, though). Finally, Girsanov's theorem and its reincarnation in form of the Esscher transform is discussed in detail. The second half of part III treats various approaches for option pricing in incomplete markets and risk neutral modelling for exponential Lévy processes. Such models are governed by non-local integrodifferential equations (as opposed to second-order partial differential equations for diffusion models); the last two chapters of part III derive these initial and boundary value problems and explain how to solve them analytically, numerically and probabilistically (via simulation). The last part, *Beyond Lévy Processes*, is a survey on more general jump models (mainly additive processes with time-dependent coefficients and characteristics) and stochastic volatility models.

The style of the book switches several times from text-book like (mainly for the presentation of Lévy processes and their stochastic calculus) to that of a mathematical, and sometimes philosophical, survey. The text reads, in places, rather oddly: for example, in Chapter 2 several pages are spent explaining measure and integration, while the more difficult conditional expectation is nonchalantly used, or the notion of an (European) option is finally explained on page 355 or we learn in a footnote on page 36 that *Stochastic is just a fancy word for random!* These make it hard to understand for whom the text is actually written. The most likely audience are professionals who are familiar with financial modelling, and who need to get a quick overview on problems and techniques of jump models. It might also serve as back-up reading for a Master of Science course on mathematical finance, but it is difficult to imagine this book as a principal course text.

Reference

P. Protter, (2004) *Stochastic Integration and Differential Equations*, 2nd edn. Berlin: Springer.

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