

**io-port 05763869****Platen, Eckhard; Bruti-Liberati, Nicola****Numerical solution of stochastic differential equations with jumps in finance.**

Stochastic Modelling and Applied Probability 64. Berlin: Springer (ISBN 978-3-642-12057-2/hbk). xxviii, 856 p. EUR 69.95; SFR 100.50; \$ 89.95; £ 62.99 (2010).

This research monograph by Eckhard Platen and Nicola Bruti-Liberati gives a comprehensive account of the theory of numerical approximation of solutions of stochastic differential equations driven by jump processes. The focus is on efficient and numerically stable strong and weak discrete-time approximations of the solutions for regular and jump-adapted approximation schemes. The authors consider Wiener processes plus Poisson random measures as driving processes. To illustrate the theory developed in the text, many examples from mathematical finance are discussed. The first part of the book is an introduction to stochastic differential equations with jumps that serves as a basis for the theory developed later in the text. Wiener process, Poisson process and Itô calculus are introduced, and existence and uniqueness results for SDEs with jumps are given. The authors develop stochastic expansions for jump diffusions and prove moment estimates of multiple stochastic integrals. In the second part, the main topic are strong discrete-time approximations of SDEs with given strong order of convergence. The discussion includes regular strong Taylor and Itô approximations and jump-adapted strong approximations. This part covers also derivative-free and predictor-corrector schemes, and estimation and also filtering methods are explained in some detail. The third part introduces several weak approximations including derivative-free, predictor-corrector and simplified schemes. This part is again divided into a section on regular Taylor approximation and jump-adapted methods. The last part is devoted to questions of numerical stability. The concepts of asymptotic  $p$ -stability and stability regions are defined. Then predictor-corrector methods, several implicit methods and also the simplified schemes introduced earlier are investigated with respect to their stability properties. This part closes with two sections on financial applications: the first one on martingale representations and hedge ratios; and the second one on variance reduction techniques in the context of derivative pricing. The text requires only undergraduate background in mathematics and is therefore accessible to a broad readership. The material is supplemented by a large number of exercises. The underlying principles are carefully explained and well motivated by the authors. Personally, I enjoyed very much the lucid and clear writing style of the exposition in combination with many interesting examples from mathematical finance.

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