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SRDJAN STOJANOVIC, "COMPUTATIONAL FINANCIAL MATHEMATICS USING MATHEMATICA: OPTIMAL TRADING STOCKS AND OPTIONS", BIRKHÄUSER VERLAG, BOSTON-BASEL-BERLIN, 2003, XI+481 PAGES

DIANA ANDRADA FILIP

The book consists in 481 pages i.e. 8 chapters, a bibliography and an index and includes CD-ROM. Srdjan Stojanovic taught the course on Financial Mathematics at the University of Cincinnati since 1998 and at Purdue University during the academic year 2001-2002. This book is an expanded version of those courses, built with the help of the students during the time when Srdjan Stojanovic taught them computational financial mathematics and MATHEMATICA^R programming.

A very interesting and very actual book, because now, the computer make an integrand part of our life. The author, himself, underlines in the Introduction, that the book is addressed to students and professors of academic programs in financial mathematics (like computational finance and financial engineering). Anyway, the mathematical background would be Calculus, Differential Equations and Probability, but varies according to the objectives of the reader. The book is, as recommends the author, divided in some parts according to the required mathematical level as follows: the basics (for the Chapters 1-4), intermediate level (the Chapters 5 and 7), advanced level (for the Chapters 6 and 8).

In the Chapter 1, **Cash Account Evolution**, ordinary differential equations are solving with Mathematica^R, and symbolic and numerical solutions of ODEs are presented.

The Chapter 2, **Stock Price Evolution**, explains to the reader what are stocks and then presents the stock price modeling, i.e. some stochastic differential equations. An other aim of this chapter is to be acquainted with Itô calculus and with multivariable and symbolic Itô calculus. Also, some relationship between SDEs and PDEs are presented.

In the Chapter 3, **European Style Stock Options**, the first paragraph deals with the notion of stock option. Then, the Black and Scholes PDE and hedging are presented and the Black and Scholes PDE are symbolically solved. Also, the generalized Black and Scholes formulas are presented.

In the Chapter 4, **Stock Market Statistics**, the stock market data import and manipulation are presented. Then, the chapter deals with the volatility estimates,

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i.e. scalar case, and also deals with the appreciation rate estimates (the scalar case) and the statistical experiments (Bayesian and non-Bayesian). In the same chapter, the vector basic price model statistics and the dynamic statistics, like the filtering of conditional Gaussian processes, are treated.

In the Chapter 5, **Implied Volatility for European Options**, the option market data is presented. After that, the Black and Scholes theory is made obvious vs. market data (the implied volatility) and then, the numerical PDEs, the optimal control and the implied volatility are studied.

The Chapter 6, **American Style Stock Options**, deals with the american options, the obstacle problems and presents the general implied volatility for american options.

Very important, the Chapter 7, **Optimal Portfolio Rules,** presents the utility of wealth, the Merton's optimal portfolio rule derived and implemented, the portfolio rules under appreciation rate uncertainty, the portfolio optimization under equality constraints, the portfolio optimization under inequality constraints.

In the Chapter 8, **Advanced Trading Strategies,** the reduced Monge-Ampère PDEs of advanced portfolio hedging and the hypoelliptic obstacle problems in optimal momentum trading are presented.

As we have already said, the book is accompanied by a CD-ROM, but the book is not a software product. Informations about further developments might be available at the web site CFMLab.com. The reader may direct comments to the same address.

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