Advanced Quantitative Finance with C++

Alonso Peña Ph.D.

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Create and implement mathematical models in C++ using Quantitative Finance

About This Book

- Describes the key mathematical models used for price equity, currency, interest rates, and credit derivatives
- The complex models are explained step-by-step along with a flow chart of every implementation
- Illustrates each asset class with fully solved C++ examples, both basic and advanced, that support and complement the text

Who This Book Is For

If you are a quantitative analyst, risk manager, actuary, or a professional working in the field of quantitative finance and want a quick hands-on introduction to the pricing of financial derivatives, this book is ideal for you. You should be familiar with the basic programming concepts and C++ programming language. You should also be acquainted with calculus of undergraduate level.

What You Will Learn

- Solve complex pricing problems in financial derivatives using a structured approach with the Bento Box template
- Explore some key numerical methods including binomial trees, finite differences, and Monte Carlo simulation
- Develop your understanding of equity, forex, interest rate, and credit derivatives through concrete examples
- Implement simple and complex derivative instruments in C++
- Discover the most important mathematical models used in quantitative finance today to price derivative instruments
- Effectively Incorporate object oriented programming (OOP) principles into the code

In Detail

This book will introduce you to the key mathematical models used to price financial derivatives, as well as the implementation of main numerical models used to solve them. In particular, equity, currency, interest rates, and credit derivatives are discussed. In the first part of the book, the main mathematical models used in the world of financial derivatives are discussed. Next, the numerical methods used to solve the mathematical models are presented. Finally, both the mathematical models and the numerical methods are used to solve some concrete problems in equity, forex, interest rate, and credit derivatives.

The models used include the Black-Scholes and Garman-Kohlhagen models, the LIBOR market model, structural and intensity credit models. The numerical methods described are Monte Carlo simulation (for

single and multiple assets), Binomial Trees, and Finite Difference Methods. You will find implementation of concrete problems including European Call, Equity Basket, Currency European Call, FX Barrier Option, Interest Rate Swap, Bankruptcy, and Credit Default Swap in C++.

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