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# Advanced Quantitative Finance with C++

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

Alonso Peña, Ph.D.

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# Advanced Quantitative Finance With C Pena Alonso

**Europa Publications**

## **Advanced Quantitative Finance With C Pena Alonso:**

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Peña,2015-02-13 Create and implement mathematical models in C using quantitative finance Overview 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 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 What you will learn from this book 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 Approach The book takes the reader through a fast but structured crash course in quantitative finance from theory to practice

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La Rosa, 2026-01-01 From the elegance of the Black Scholes equation to the complexity of multi factor interest rate models and hybrid derivatives this book is your comprehensive guide to quantitative finance complete with 15 advanced C projects using QuantLib and Boost You'll move seamlessly from mathematical foundations to real world implementation building a professional grade toolkit for pricing risk analysis and calibration Inside you will learn core option pricing methods master single and multi factor interest rate models and construct and calibrate trees and lattices for advanced derivatives You will also explore cutting edge products exotic multi asset options hybrid derivatives credit instruments and cross currency swaps Packed with practical source code step by step calibrations and performance tuned Boost integration this book bridges the gap between academic finance and production grade quant development Whether you're a quant developer financial engineer or an advanced student you'll gain the skills to design implement and deploy derivatives pricing models ready for the trading floor What You Will Learn Understand the mathematics behind Black Scholes Vasicek Hull White CIR BDT Black Karasinski and other core models Apply finite difference schemes trinomial trees and Monte Carlo simulations for derivative pricing Build and value swaps swaptions FRAs bonds callable convertible debt and multi curve term structures Implement barrier multi asset hybrid and structured products in C Model credit default swaps cross currency swaps and total return structures Use QuantLib and Boost to create production grade pricing engines and calibration tools Employ Gaussian models market models and global optimizers for fitting market data Integrate code into professional workflows ensuring speed accuracy and maintainability Who This Book is for Quantitative developers financial engineers traders analysts and graduates students using C QuantLib Boost and robust tools to price hedge and manage risk for complex financial instruments and for software engineers aiming to bridge theory and industry practice in quantitative finance Optional prerequisite Mastering Quantitative Finance with Modern C Foundations Derivatives and Computational Methods for readers who want to build a solid foundation before tackling the advanced models and projects in this book

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the author himself also appears throughout the book in cartoon form readers will be relieved to hear to personally highlight and explain the key sections and issues discussed Note CD ROM DVD and other supplementary materials are not included as part of eBook file

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