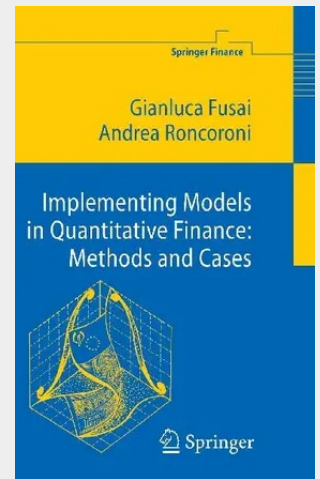


Implementing Models in Quantitative Finance: Methods and Cases

This book puts numerical methods in action for the purpose of solving practical problems in quantitative finance. It fills a gap in the current published literature by delivering a case-study collection together with a self-contained course on major numerical methods developed and used by the finance industry. The book originates from class notes and case studies developed within a course on numerical methods in finance held by the authors at Bocconi University. The first part develops a toolkit in numerical methods for finance (Monte Carlo, PDE, Stochastic Optimization, Copula, Econometrics). The second part proposes twenty self-contained cases covering model simulation, asset pricing and hedging, risk management, statistical estimation and model calibration.

Introduction This book presents and develops major numerical methods currently used for solving problems arising in quantitative finance. Our presentation splits into two parts. Part I is methodological, and offers a comprehensive toolkit on numerical methods and algorithms. This includes Monte Carlo simulation, numerical schemes for partial differential equations, stochastic optimization in discrete time, copula functions, transform-based methods and quadrature techniques. Part II is practical, and features a number of self-contained cases. Each case introduces a concrete problem and offers a detailed, step-by-step solution. Computer code that implements the cases and the resulting output is also included. The cases encompass a wide variety of quantitative issues arising in markets for equity, interest rates, credit risk, energy and exotic derivatives. The corresponding problems cover model simulation, derivative valuation, dynamic hedging, portfolio selection, risk management, statistical estimation and model calibration. We provide algorithms implemented using either Matlab or Visual Basic for R Applications (VBA). Several codes are made available through a link accessible from the Editor's web site. **Origin** Necessity is the mother of invention and, as such, the present work originates in class notes and problems developed for the courses 'Numerical Methods in Finance' and 'Exotic Derivatives' offered by the authors at Bocconi University within the Master in Quantitative Finance and Insurance program (from 2000 to 2003 and 2004) and the Master of Quantitative Finance and Risk Management program (2004 to 2005 to present).



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