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| Nota di contenuto | Intro -- A Workout in Computational Finance -- Contents -- Acknowledgements -- About the Authors -- 1 Introduction and Reading Guide -- 2 Binomial Trees -- 2.1 Equities and Basic Options -- 2.2 The One Period Model -- 2.3 The Multiperiod Binomial Model -- 2.4 Black-Scholes and Trees -- 2.5 Strengths and Weaknesses of Binomial Trees -- 2.5.1 Ease of Implementation -- 2.5.2 Oscillations -- 2.5.3 Non-recombining Trees -- 2.5.4 Exotic Options and Trees -- 2.5.5 Greeks and Binomial Trees -- 2.5.6 Grid Adaptivity and Trees -- 2.6 Conclusion -- 3 Finite Differences and the Black-Scholes PDE -- 3.1 A Continuous Time Model for Equity Prices -- 3.2 Black-Scholes Model: From the SDE to the PDE -- 3.3 Finite Differences -- 3.4 Time Discretization -- 3.5 Stability Considerations -- 3.6 Finite Differences and the Heat Equation -- 3.6.1 Numerical Results -- 3.7 Appendix: Error Analysis -- 4 Mean Reversion and Trinomial Trees -- 4.1 Some Fixed Income Terms -- 4.1.1 Interest Rates and Compounding -- 4.1.2 Libor Rates and Vanilla Interest Rate Swaps -- 4.2 Black76 for Caps and Swaptions -- 4.3 One-Factor Short Rate Models -- 4.3.1 Prominent Short Rate Models -- 4.4 The Hull-White Model in More Detail -- 4.5 |

Sommario/riassunto

A comprehensive introduction to various numerical methods used in computational finance today Quantitative skills are a prerequisite for anyone working in finance or beginning a career in the field, as well as risk managers. A thorough grounding in numerical methods is necessary, as is the ability to assess their quality, advantages, and limitations. This book offers a thorough introduction to each method, revealing the numerical traps that practitioners frequently fall into. Each method is referenced with practical, real-world examples in the areas of valuation, risk analysis, and calibration of specific financial instruments and models. It features a strong emphasis on robust schemes for the numerical treatment of problems within computational finance. Methods covered include PDE/PIDE using finite differences or finite elements, fast and stable solvers for sparse grid systems, stabilization and regularization techniques for inverse problems resulting from the calibration of financial models to market data, Monte Carlo and Quasi Monte Carlo techniques for simulating high dimensional systems, and local and global optimization tools to solve the minimization problem.