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Nota di contenuto	Cover; Title Page; Copyright Page; Contents; Preface; Part I Overview and Motivation; 1 Introduction to Monte Carlo Methods; 1.1 Historical origin of Monte Carlo simulation; 1.2 Monte Carlo simulation vs. Monte Carlo sampling; 1.3 System dynamics and the mechanics of Monte Carlo simulation; 1.3.1 Discrete-time models; 1.3.2 Continuous-time models; 1.3.3 Discrete-event models; 1.4 Simulation and optimization; 1.4.1 Nonconvex optimization; 1.4.2 Stochastic optimization; 1.4.3 Stochastic dynamic programming; 1.5 Pitfalls in Monte Carlo simulation; 1.5.1 Technical issues 1.5.2 Philosophical issues1.6 Software tools for Monte Carlo simulation; 1.7 Prerequisites; 1.7.1 Mathematical background; 1.7.2 Financial background; 1.7.3 Technical background; For further reading; References; 2 Numerical Integration Methods; 2.1 Classical quadrature formulas; 2.1.1 The rectangle rule; 2.1.2 Interpolatory quadrature formulas; 2.1.3 An alternative derivation; 2.2 Gaussian quadrature; 2.2.1 Theory of Gaussian quadrature: The role of orthogonal polynomials; 2.2.2 Gaussian quadrature in R; 2.3 Extension to higher

dimensions: Product rules

2.4 Alternative approaches for high-dimensional integration2.4.1 Monte Carlo integration; 2.4.2 Low-discrepancy sequences; 2.4.3 Lattice methods; 2.5 Relationship with moment matching; 2.5.1 Binomial lattices; 2.5.2 Scenario generation in stochastic programming; 2.6 Numerical integration in R; For further reading; References; Part II Input Analysis: Modeling and Estimation; 3 Stochastic Modeling in Finance and Economics; 3.1 Introductory examples; 3.1.1 Single-period portfolio optimization and modeling returns; 3.1.2 Consumption-saving with uncertain labor income
3.1.3 Continuous-time models for asset prices and interest rates3.2 Some common probability distributions; 3.2.1 Bernoulli, binomial, and geometric variables; 3.2.2 Exponential and Poisson distributions; 3.2.3 Normal and related distributions; 3.2.4 Beta distribution; 3.2.5 Gamma distribution; 3.2.6 Empirical distributions; 3.3 Multivariate distributions: Covariance and correlation; 3.3.1 Multivariate distributions; 3.3.2 Covariance and Pearson''s correlation; 3.3.3 R functions for covariance and correlation; 3.3.4 Some typical multivariate distributions; 3.4 Modeling dependence with copulas
3.4.1 Kendall''s tau and Spearman''s rho3.4.2 Tail dependence; 3.5 Linear regression models: A probabilistic view; 3.6 Time series models; 3.6.1 Moving-average processes; 3.6.2 Autoregressive processes; 3.6.3 ARMA and ARIMA processes; 3.6.4 Vector autoregressive models; 3.6.5 Modeling stochastic volatility; 3.7 Stochastic differential equations; 3.7.1 From discrete to continuous time; 3.7.2 Standard Wiener process; 3.7.3 Stochastic integration and Ito''s lemma; 3.7.4 Geometric Brownian motion; 3.7.5 Generalizations; 3.8 Dimensionality reduction; 3.8.1 Principal component analysis (PCA)
3.8.2 Factor models

Sommario/riassunto

An accessible treatment of Monte Carlo methods, techniques, and applications in the field of finance and economics Providing readers with an in-depth and comprehensive guide, the Handbook in Monte Carlo Simulation: Applications in Financial Engineering, Risk Management, and Economics presents a timely account of the applicationsof Monte Carlo methods in financial engineering and economics. Written by an international leading expert in thefield, the handbook illustrates the challenges confronting present-day financial practitioners and provides various applicationsof Monte Carlo techniques to