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Nota di contenuto	Stochastic Simulation and Applications in Finance with MATLAB® Programs; Contents; Preface; 1 Introduction to Probability; 1.1 Intuitive Explanation; 1.1.1 Frequencies; 1.1.2 Number of Favorable Cases Over The Total Number of Cases; 1.2 Axiomatic Definition; 1.2.1 Random Experiment; 1.2.2 Event; 1.2.3 Algebra of Events; 1.2.4 Probability Axioms; 1.2.5 Conditional Probabilities; 1.2.6 Independent Events; 2 Introduction to Random Variables; 2.1 Random Variables; 2.1.1 Cumulative Distribution Function; 2.1.2 Probability Density Function 2.1.3 Mean, Variance and Higher Moments of a Random Variable2.1.4 Characteristic Function of a Random Variable; 2.2 Random vectors; 2.2.1 Cumulative Distribution Function of a Random Vector; 2.2.2

Probability Density Function of a Random Vector; 2.2.3 Marginal Distribution of a Random Vector; 2.2.4 Conditional Distribution of a Random Vector; 2.2.5 Mean, Variance and Higher Moments of a Random Vector; 2.2.6 Characteristic Function of a Random Vector; 2.3 Transformation of Random Variables; 2.4 Transformation of Random Vectors

2.5 Approximation of the Standard Normal Cumulative Distribution Function3 Random Sequences; 3.1 Sum of Independent Random Variables; 3.2 Law of Large Numbers; 3.3 Central Limit Theorem; 3.4 Convergence of Sequences of Random Variables; 3.4.1 Sure Convergence; 3.4.2 Almost Sure Convergence; 3.4.3 Convergence in Probability; 3.4.4 Convergence in Quadratic Mean; 4 Introduction to Computer Simulation of Random Variables; 4.1 Uniform Random Variable Generator; 4.2 Generating Discrete Random Variables; 4.2.1 Finite Discrete Random Variables

4.2.2 Infinite Discrete Random Variables: Poisson Distribution4.3 Simulation of Continuous Random Variables; 4.3.1 Cauchy Distribution; 4.3.2 Exponential Law; 4.3.3 Rayleigh Random Variable; 4.3.4 Gaussian Distribution; 4.4 Simulation of Random Vectors; 4.4.1 Case of a Two-Dimensional Random Vector; 4.4.2 Cholesky Decomposition of the Variance-Covariance Matrix; 4.4.3 Eigenvalue Decomposition of the Variance-Covariance Matrix; 4.4.4 Simulation of a Gaussian Random Vector with MATLAB; 4.5 Acceptance-Rejection Method; 4.6 Markov Chain Monte Carlo Method (MCMC)

4.6.1 Definition of a Markov Process4.6.2 Description of the MCMC Technique; 5 Foundations of Monte Carlo Simulations; 5.1 Basic Idea; 5.2 Introduction to the Concept of Precision; 5.3 Quality of Monte Carlo Simulations Results; 5.4 Improvement of the Quality of Monte Carlo Simulations or Variance Reduction Techniques; 5.4.1 Quadratic Resampling; 5.4.2 Reduction of the Number of Simulations Using Antithetic Variables; 5.4.3 Reduction of the Number of Simulations Using Control Variates; 5.4.4 Importance Sampling; 5.5 Application Cases of Random Variables Simulations

5.5.1 Application Case: Generation of Random Variables as a Function of the Number of Simulations

Sommario/riassunto	Stochastic Simulation and Applications in Finance with MATLAB Programs explains the fundamentals of Monte Carlo simulation techniques, their use in the numerical resolution of stochastic differential equations and their current applications in finance. Building on an integrated approach, it provides a pedagogical treatment of the need-to-know materials in risk management and financial engineering. The book takes readers through the basic concepts, covering the most recent research and problems in the area, including: the quadratic re-sampling technique, the Least Squared Method, the d