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4.3 Correlation Methods for Variance Reduction4.3.1 Antithetic Variates; 4.3.2 Stratification Methods; 4.4 Adaptive Monte Carlo Methods; 4.5 Quasi-Monte Carlo; 4.5.1 Low-Discrepancy Sequences; 4.5.2 Error Estimation for Quasi-Monte Carlo Quadrature; 4.5.3 Applications of Quasi-Monte Carlo; 4.6 Comparison of Monte Carlo Integration, Quasi-Monte Carlo and Numerical Quadrature; References; Further Reading; 5 Random Walks, Integral Equations, and Variance Reduction; 5.1 Properties of Discrete Markov Chains; 5.1.1 Estimators and Markov Processes; 5.2 Applications Using Markov Chains
5.2.1 Simulated Annealing5.2.2 Genetic Algorithms; 5.2.3 Poisson Processes and Continuous Time Markov Chains; 5.2.4 Brownian Motion; 5.3 Integral Equations; 5.3.1 Radiation Transport and Random Walks; 5.3.2 The Boltzmann Equation; 5.4 Variance Reduction; 5.4.1 Importance Sampling of Integral Equations; References; Further Reading; 6 Simulations of Stochastic Systems: Radiation Transport; 6.1 Radiation Transport as a Stochastic Process; 6.2 Characterization of the Source; 6.3 Tracing a Path; 6.4 Modeling Collision Events; 6.5 The Boltzmann Equation and Zero Variance Calculations
6.5.1 Radiation Impinging on a Slab

Sommario/riassunto

This introduction to Monte Carlo methods seeks to identify and study the unifying elements that underlie their effective application. Initial chapters provide a short treatment of the probability and statistics needed as background, enabling those without experience in Monte Carlo techniques to apply these ideas to their research.The book focuses on two basic themes: The first is the importance of random walks as they occur both in natural stochastic systems and in their relationship to integral and differential equations. The second theme is that of variance reduction in general and impor