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Nota di contenuto	Front Cover; Exploring Monte Carlo Methods; Copyright; Dedication; Table of Contents; Preface; Chapter 1. Introduction; 1.1 What Is Monte Carlo?; 1.2 A Brief History of Monte Carlo; 1.3 Monte Carlo as Quadrature; 1.4 Monte Carlo as Simulation; 1.5 Preview of Things to Come; 1.6 Summary; Bibliography; Problems; Chapter 2. The Basis of Monte Carlo; 2.1 Single Continuous Random Variables; 2.2 Discrete Random Variables; 2.3 Multiple Random Variables; 2.4 The Law of Large Numbers; 2.5 The Central Limit Theorem; 2.6 Monte Carlo Quadrature; 2.7 Monte Carlo Simulation; 2.8 Summary; Bibliography ProblemsChapter 3. Pseudorandom Number Generators; 3.1 Linear Congruential Generators; 3.2 Structure of the Generated Random Numbers; 3.3 Characteristics of Good Random Number Generators; 3.4 Tests for Congruential Generators; 3.5 Practical Multiplicative Congruential Generators; 3.6 Shuffling a Generator's Output; 3.7 Skipping Ahead; 3.8 Combining Generators; 3.9 Other Random Number Generators; 3.10 Summary; Bibliography; Problems; Chapter 4. Sampling, Scoring, and Precision; 4.1 Sampling; 4.2 Scoring; 4.3 Accuracy and Precision; 4.4 Summary; Bibliography; Problems Chapter 5. Variance Reduction Techniques5.1 Use of Transformations; 5.2 Importance Sampling; 5.3 Systematic Sampling; 5.4 Stratified

Sampling; 5.5 Correlated Sampling; 5.6 Partition of the Integration Volume; 5.7 Reduction of Dimensionality; 5.8 Russian Roulette and Splitting; 5.9 Combinations of Different Variance Reduction Techniques; 5.10 Biased Estimators; 5.11 Improved Monte Carlo Integration Schemes; 5.12 Summary; Bibliography; Problems; Chapter 6. Markov Chain Monte Carlo; 6.1 Markov Chains to the Rescue; 6.2 Brief Review of Probability Concepts; 6.3 Bayes Theorem 6.4 Inference and Decision Applications 6.5 Summary; Bibliography; Problems; Chapter 7. Inverse Monte Carlo; 7.1 Formulation of the Inverse Problem; 7.2 Inverse Monte Carlo by Iteration; 7.3 Symbolic Monte Carlo; 7.4 Inverse Monte Carlo by Simulation; 7.5 General Applications of IMC; 7.6 Summary; Bibliography; Problems; Chapter 8. Linear Operator Equations; 8.1 Linear Algebraic Equations; 8.2 Linear Integral Equations; 8.3 Linear Differential Equations; 8.4 Eigenvalue Problems; 8.5 Summary; Bibliography; Problems; Chapter 9. The Fundamentals of Neutral Particle Transport 9.1 Description of the Radiation Field 9.2 Radiation Interactions with the Medium; 9.3 Transport Equation; 9.4 Adjoint Transport Equation; 9.5 Summary; Bibliography; Problems; Chapter 10. Monte Carlo Simulation of Neutral Particle Transport; 10.1 Basic Approach for Monte Carlo Transport Simulations; 10.2 Geometry; 10.3 Sources; 10.4 Path-Length Estimation; 10.5 Purely Absorbing Media; 10.6 Type of Collision; 10.7 Time Dependence; 10.8 Particle Weights; 10.9 Scoring and Tallies; 10.10 An Example of One-Speed Particle Transport; 10.11 Monte Carlo Based on the Integral Transport Equation 10.12 Variance Reduction and Nonanalog Methods

Sommario/riassunto

Exploring Monte Carlo Methods is a basic text that describes the numerical methods that have come to be known as "Monte Carlo." The book treats the subject generically through the first eight chapters and, thus, should be of use to anyone who wants to learn to use Monte Carlo. The next two chapters focus on applications in nuclear engineering, which are illustrative of uses in other fields. Five appendices are included, which provide useful information on probability distributions, general-purpose Monte Carlo codes for radiation transport, and other matters. The famous "Buffon's needle p
