Monte Carlo: Concepts, Algorithms, and Applications

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This volume presents a comprehensive first course in the Monte Carlo method which will be suitable for graduate and undergraduate students in the mathematical sciences and engineering, principally operations research, statistics, mathematics, and computer science. The reader is assumed to have a sound understanding of calculus, introductory matrix analysis, probability, and intermediate statistics, but otherwise the book is self-contained.

As well as a thorough exploration of the important concepts of the Monte Carlo method, the volume includes over 90 algorithms which allow the reader to move rapidly from the concepts to putting them into practice. The book also contains numerous exercises, many of them hands-on implementations of selected algorithms to demonstrate the application of these ideas in realistic settings. Software, freely available via ftp and portable across computing platforms, provides programs for pseudorandom number generation and statistical sample path data analysis. The software is suitable for use with the exercises as well as for more general applications.

For professional mathematical scientists and engineers this book provides a ready reference to the Monte Carlo method, especially to implementable algorithms for performing sampling experiments on a computer and for analyzing their results.