Monte Carlo statistical methods, particularly those based on Markov chains, are now an essential component of the standard set of techniques used by statisticians. This new edition has been revised towards a coherent and flowing coverage of these simulation techniques, with incorporation of the most recent developments in the field. In particular, the introductory coverage of random variable generation has been totally revised, with many concepts being unified through a fundamental theorem of simulation

There are five completely new chapters that cover Monte Carlo control, reversible jump, slice sampling, sequential Monte Carlo, and perfect sampling. There is a more in-depth coverage of Gibbs sampling, which is now contained in three consecutive chapters. The development of Gibbs sampling starts with slice sampling and its connection with the fundamental theorem of simulation, and builds up to two-stage Gibbs sampling and its theoretical properties. A third chapter covers the multi-stage Gibbs sampler and its variety of applications. Lastly, chapters from the previous edition have been revised towards easier access, with the examples getting more detailed coverage.

This textbook is intended for a second year graduate course, but will also be useful to someone who either wants to apply simulation techniques for the resolution of practical problems or wishes to grasp the fundamental principles behind those methods. The authors do not assume familiarity with Monte Carlo techniques (such as random variable generation), with computer programming, or with any Markov chain theory (the necessary concepts are developed in Chapter 6). A solutions manual, which covers approximately 40% of the problems, is available for instructors who require the book for a course.

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