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Monte Carlo statistical methods, particularly those based on Markov chains, have now matured to be part of the standard set of techniques used by statisticians. This book is intended to bring these techniques into the classroom, being a self-contained logical development of the subject. This is a textbook intended for a second year graduate course. We do not assume that the reader has any familiarity with Monte Carlo techniques (such as random variable generation), or with any Markov chain theory. Chapters 1-3 are introductory, first reviewing various statistical methodologies, then covering the basics of random variable generation and Monte Carlo integration. Chapter 4 is an introduction to Markov chain theory, and Chapter 5 provides the first application of Markov chains to optimization problems. Chapters 6 and 7 cover the heart of MCMC methodology, the Metropolis-Hastings algorithm and the Gibbs sampler. Finally, Chapter 8 presents methods for monitoring convergence of the MCMC methods, while Chapter 9 shows how these methods apply to some statistical settings which cannot be processed otherwise. Each chapter concludes with a section of notes that serve to enhance the discussion in the chapters. Christian P. Robert is Professor of Statistics in the Mathematics Department at the University of Rouen, France. He is also Head of the Statistics Laboratory at the Center for Research in Economics and Statistics (CREST) of the National Institute for Statistics and Economic Studies (INSEE) in Paris, and Lecturer at Ecole Polytechnique. In addition to many papers on Bayesian statistics, simulation, and decision theory, he has written three other books, including The Bayesian Choice, Springer 1994. He also edited Discretization and MCMC Convergence Assessment, Springer 1998. He has served as associate editor for the Annals of Statistics and the Journal of the American Statistical Association. He is a fellow of the Institute of Mathematical Statistics, and a winner of the Young Statistician Award of the Société de Statistique de Paris in 1995. George Casella is the Liberty Hyde Bailey Professor of Biological Statistics in the College of Agriculture and Life Sciences at Cornel University. He is active in many aspects on both theoretical and applied statistics, and has served as the Theory and Methods Editor of the Journal of the American Statistical Association. He has authored three other textbooks: Statistical Inference, 1990, with Roger L. Berger; Variance Components, 1992, with Shayle R. Searle and Charles E. McCulloch; and Theory of Point Estimation, 1998, with

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