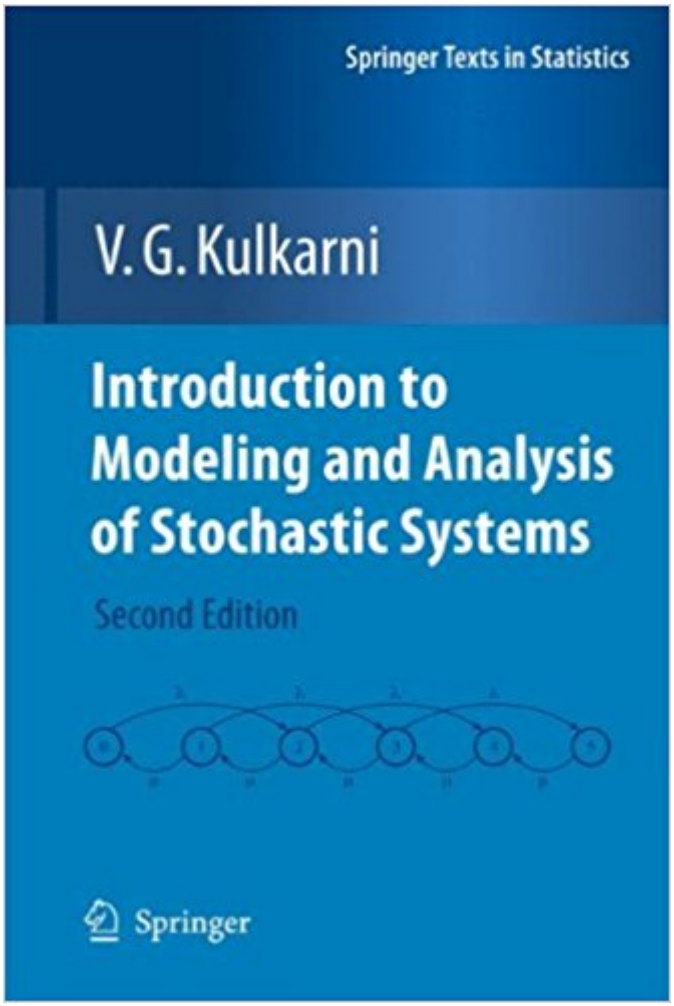
# Introduction To Modeling And Analysis Of Stochastic Systems (Springer Texts In Statistics)



## Synopsis

This book provides a self-contained review of all the relevant topics in probability theory. A software package called MAXIM, which runs on MATLAB, is made available for downloading. Vidyadhar G. Kulkarni is Professor of Operations Research at the University of North Carolina at Chapel Hill.

## Book Information

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## Customer Reviews

From the reviews of the second edition:Ã¢â ¬Å“The author has added a new chapter on Poisson processes and another one on Brownian motion. The discussion is kept on an elementary level and does not require any knowledge from measure theory or advanced calculus. Ã¢â ¬Â¦ the text is suitable for an undergraduate course on probabilistic modeling for students from physics, engineering, operations research, computer science, business administration or some related field that needs advanced modeling techniques.Ã¢â ¬Â• (H. M. Mai, Zentralblatt MATH, Vol. 1222, 2011)Ã¢â ¬Å“Suitable for undergraduates in Mathematics, Statistics, Operations Research, Computer Science, Business Administration, Public Policy, etc. This is a very clear and readable text on Markov chains, Poisson processes, continuous time Markov chains, renewal processes, and queuing processes. Ã¢â ¬Â¦ The treatment is very clear, intuitive as well as rigorous, without being pedantic, and full of interesting examples and case studies. Ã¢â ¬Â¦ The book should be fun to teach from and learn from.Ã¢â ¬Â• (Jayanta K. Ghosh, International Statistical Review, Vol. 80 (3), 2012)

This is an introductory-level text on stochastic modeling. It is suited for undergraduate students in engineering, operations research, statistics, mathematics, actuarial science, business management, computer science, and public policy. It employs a large number of examples to teach the students to use stochastic models of real-life systems to predict their performance, and use this analysis to design better systems. The book is devoted to the study of important classes of stochastic processes: discrete and continuous time Markov processes, Poisson processes, renewal and regenerative processes, semi-Markov processes, queueing models, and diffusion processes. The book systematically studies the short-term and the long-term behavior, cost/reward models, and first passage times. All the material is illustrated with many examples, and case studies. The book provides a concise review of probability in the appendix. The book emphasizes numerical answers to the problems. A collection of MATLAB programs to accompany the this book can be downloaded from http://www.unc.edu/~vkulkarn/Maxim/maxim.zip. A graphical user interface to access the above files can be downloaded from http://www.unc.edu/~vkulkarn/Maxim/maximgui.zip . The second edition incorporates several changes. First its title reflects the changes in content: the chapters on design and control have been removed. The book now contains several case studies that teach the design principles. Two new chapters have been added. The new chapter on Poisson processes gives more attention to this important class of stochastic processes than the first edition did. The new chapter on Brownian motion reflects its increasing importance as an appropriate model for a variety of real-life situations, including finance. V. G. Kulkarni is Professor in the Department of Statistics and Operations Research in the University of North Carolina, Chapel Hill. He has authored a graduate-level text Modeling and Analysis of Stochastic Systems and dozens of articles on stochastic models of queues, computer and communications systems, and production and supply chain systems. He holds a patent on traffic management in telecommunication networks, and has served on the editorial boards of Operations Research Letters, Stochastic Models, and Queueing Systems and Their Applications.

This is a very good text to study stochastic processes for the first time. It contains a review on basic probability material in the four first chapters, which is quite extensive for a review, but very useful, since usually undergraduate students have covered in detail only parts of the material they will need to study Markov Chains and other stochastic processes.Grad students will find probably find it useful too, since after the review, discrete and continuous Markov chains, queuing models and other topics are presented and illustrated with many examples. They serve to clarify propositions

and theorems that are formally proved.In general, I think this book helps to develop the intuition necessary to use Markov processes in many practical applications, and understand higher level texts.Of course, having a broad topic coverage at introductory level, some more advenced topics (like positive and null recurrency) had to be left out, so grad students will need some other reference too (Kulkarni has a grad text, in case you like this one).

This is probably ideal as a reference source for a graduate student or professor who knows stochastics very well already.However, if you are a novice trying to learn about stochastics and want good explanations and examples with an appropriate buildup, I would not recommend the book.As an example, the review discussion of probability in the first four chapters didn't even come close to comparing with the probability book I used in another class. If you are near a bookstore, you can easily verify this. I imagine that this comparison (or lack thereof) would hold for many other probability textbooks. Also, if presentation makes a difference to you, this is quite minimalist.Another area that I found lacking is that the answers in the back just provide a numerical answer without any explanation to how solutions were arrived at. While this is often the case for other books, the author did not provide a sufficient base for a novice to work the problems. As a result, most of the end of chapter problems were of little use in helping me better learn the materials. A good workbook or better explanations would be very helpful.While there are certainly couple areas that I found worthwhile and this does appear to be one of the only books on this niche area (the lack of competition may explain a lot of why the shortcomings exist and why this doesn't have the feel of real textbook), this first edition book needs some serious work to make it truly effective and user friendly.

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