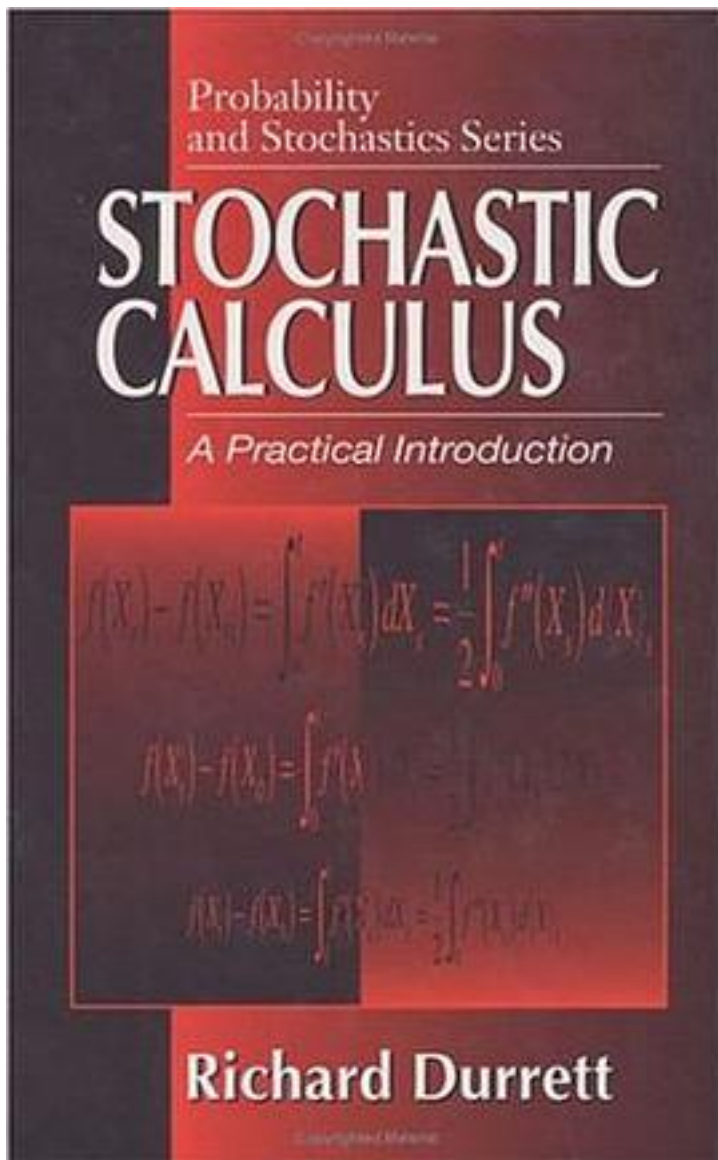# Stochastic Calculus



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This work focuses on analyzing and presenting solutions for a wide range of stochastic problems that are encountered in applied mathematics, probability, physics, engineering, finance, and economics. The approach used reduces the gap between the mathematical and engineering literature. Stochastic problems are defined by algebraic, differential or integral equations with random coefficients and/or input. However, it is the type, rather than the particular field of application, that is used to categorize these problems. An introductory chapter outlines the types of stochastic problems under consideration in this book and illustrates some of their applications. A user friendly, systematic exposition unfolds as follows: the essentials of probability theory, random processes, stochastic integration, and Monte Carlo simulation are developed in chapters 2-5. The Monte Carlo method is used extensively to illustrate difficult theoretical concepts and solve numerically some of the stochastic problems in chapters 6-9. Key features include: computational skills developed as needed to solve realistic stochastic problems; classical mathematical notation used, and essential theoretical facts boxed; numerous examples from applied sciences and engineering; complete proofs given - if too technical, notes clarify the idea and/or main steps; problems at the end of each chapter reinforce applications; hints given; good bibliography at the end of every chapter; and, comprehensive index. This work is unique, self-contained, and far from a collection of facts and formulas. The analytical and numerical methods approach for solving stochastic problems may be used for self-study by a variety of researchers, and in the classroom by first year graduate students.

作者介绍:

目录:

[Stochastic Calculus_下载链接1_](#)

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