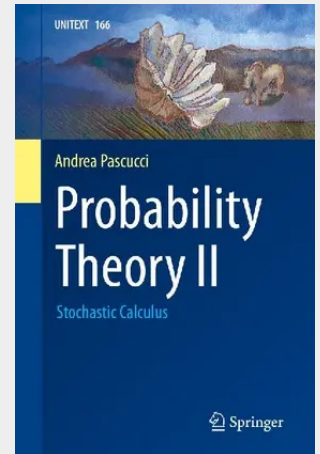


Probability Theory II

Stochastic Calculus

This book offers a modern approach to the theory of continuous-time stochastic processes and stochastic calculus. The content is treated rigorously, comprehensively, and independently. In the first part, the theory of Markov processes and martingales is introduced, with a focus on Brownian motion and the Poisson process. Subsequently, the theory of stochastic integration for continuous semimartingales was developed. A substantial portion is dedicated to stochastic differential equations, the main results of solvability and uniqueness in weak and strong sense, linear stochastic equations, and their relation to deterministic partial differential equations. Each chapter is accompanied by numerous examples. This text stems from over twenty years of teaching experience in stochastic processes and calculus within master's degrees in mathematics, quantitative finance, and postgraduate courses in mathematics for applications and mathematical finance at the University of Bologna. The book provides material for at least two semester-long courses in scientific studies (Mathematics, Physics, Engineering, Statistics, Economics, etc.) and aims to provide a solid background for those interested in the development of stochastic calculus theory and its applications. This text completes the journey started with the first volume of Probability Theory I - Random Variables and Distributions, through a selection of advanced classic topics in stochastic analysis.

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