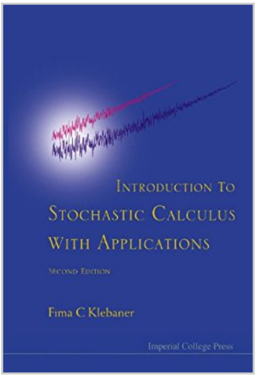

Introduction to Stochastic Calculus with Applications

By Fima C Klebaner

Introduction to Stochastic Calculus with Applications By Fima C Klebaner

This book presents a concise treatment of stochastic calculus and its applications. It gives a simple but rigorous treatment of the subject including a range of advanced topics, it is useful for practitioners who use advanced theoretical results. It covers advanced applications, such as models in mathematical finance, biology and engineering.

Self-contained and unified in presentation, the book contains many solved examples and exercises. It may be used as a textbook by advanced undergraduates and graduate students in stochastic calculus and financial mathematics. It is also suitable for practitioners who wish to gain an understanding or working knowledge of the subject. For mathematicians, this book could be a first text on stochastic calculus; it is good companion to more advanced texts by a way of examples and exercises. For people from other fields, it provides a way to gain a working knowledge of stochastic calculus. It shows all readers the applications of stochastic calculus methods and takes readers to the technical level required in research and sophisticated modelling.

This second edition contains a new chapter on bonds, interest rates and their options. New materials include more worked out examples in all chapters, best estimators, more results on change of time, change of measure, random measures, new results on exotic options, FX options, stochastic and implied volatility, models of the age-dependent branching process and the stochastic Lotka-Volterra model in biology, non-linear filtering in engineering and five new figures.

Instructors can obtain slides of the text from the author.

Contents:

- Preliminaries from Calculus
- Concepts of Probability Theory
- Basic Stochastic Processes
- Brownian Motion Calculus
- Stochastic Differential Equations

- Diffusion Processes
- Martingales
- Calculus for Semimartingales
- Pure Jump Processes
- Change of Probability Measure
- Applications in Finance: Stock and FX Options
- Applications in Finance: Bonds, Rates and Options
- Applications in Biology
- Applications in Engineering and Physics

Readership: Academics, mathematicians, advanced undergraduates, graduates, practitioners in finance, risk managers and electrical engineers.

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- Format: Kindle eBook

Editorial Review

Review
"It provides a good introduction to stochastic analysis, leaving out several of the more technical proofs."

.,." contains many worked out examples while the stochastic calculus is presented in a concentrated but transparent form.?

From the Author
I wanted to write a book that would introduce stochastic calculus, which is a very technical subject, in a simpleminded way. The book is a mathematical text, but the entrance level is lower than other rigorous stochastic calculus books. It is is suitable for advanced undergraduates, graduates and researchers in probability & statistics and mathematical finance.

From the Inside Flap
This book presents a concise and rigorous treatment of stochastic calculus. It also gives its main applications in finance, biology and engineering. In finance, the stochastic calculus is applied to pricing options by no arbitrage. In biology, it is applied to populations' models, and in engineering it is applied to filter signal from noise. Not everything is proved, but enough proofs are given to make it a mathematically rigorous exposition.

This book aims to present the theory of stochastic calculus and its applications to an audience which possesses only a basic knowledge of calculus and probability. It may be used as a textbook by graduate and advanced undergraduate students in stochastic processes, financial mathematics and engineering. It is also suitable for researchers to gain working knowledge of the subject. It contains many solved examples and exercises making it suitable for self study.

In the book many of the concepts are introduced through worked-out examples, eventually leading to a complete, rigorous statement of the general result, and either a complete proof, a partial proof or a reference. Using such structure, the text will provide a mathematically literate reader with rapid introduction to the subject and its advanced applications. The book covers models in mathematical finance, biology and engineering. For mathematicians, this book can be used as a first text on stochastic calculus or as a companion to more rigorous texts by a way of examples and exercises.

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