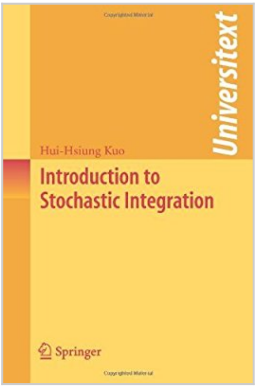

Introduction to Stochastic Integration (Universitext)

By Hui-Hsiung Kuo

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The theory of stochastic integration, also called the Ito calculus, has a large spectrum of applications in virtually every scientific area involving random functions, but it can be a very difficult subject for people without much mathematical background. The Ito calculus was originally motivated by the construction of Markov diffusion processes from infinitesimal generators. Previously, the construction of such processes required several steps, whereas Ito constructed these diffusion processes directly in a single step as the solutions of stochastic integral equations associated with the infinitesimal generators. Moreover, the properties of these diffusion processes can be derived from the stochastic integral equations and the Ito formula. This introductory textbook on stochastic integration provides a concise introduction to the Ito calculus, and covers the following topics: - Constructions of Brownian motion - Stochastic integrals for Brownian motion and martingales - The Ito formula - Multiple Wiener-Ito integrals - Stochastic differential equations - Applications to finance, filtering theory, and electric circuits The reader should have a background in advanced calculus and elementary probability theory, as well as a basic knowledge of measure theory and Hilbert spaces. Each chapter ends with a variety of exercises designed to help the reader further understand the material. Hui-Hsiung Kuo is the Nicholson Professor of Mathematics at Louisiana State University. He has delivered lectures on stochastic integration at Louisiana State University, Cheng Kung University, Meijo University, and University of Rome 'Tor Vergata,' among others. He is also the author of Gaussian Measures in Banach Spaces (Springer 1975), and White Noise Distribution Theory (CRC Press 1996), and a memoir of his childhood growing up in Taiwan, An Arrow Shot into the Sun (Abridge Books 2004).

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Editorial Review

Review

From the reviews:

"This textbook is a self-contained and systematic introduction to Itô's stochastic integration with respect to martingales. The author gives special emphasis to the Brownian motion case. … Exercises are given in each chapter." (Jorge A. León, Mathematical Reviews, Issue 2006 e)

"Introduction to Stochastic Integration is exactly what the title says. I would maybe just add a 'friendly' introduction because of the clear presentation and flow of the contents. … Given its clear structure and composition, the book could be useful for a short course on stochastic integration. The concepts are easy to grasp … . Problems are given in each chapter and naturally are proof-based." (Ita Cirovic Donev, The Mathematical Sciences Digital Library, June, 2006)

"This is a very good book on stochastic integration covering subjects from a construction of a Brownian motion to stochastic differential equations. It grew up from lecture notes the author elaborated during several years, and can be equally well used for teaching and self-education. The text is extremely clear and concise both in language and mathematical notation. Every topic is illustrated by simple and motivating examples. … is a timely, happily designed and well written book. It will be useful for unprepared and advanced readers." (Ilya Pavlyukevich, Zentralblatt MATH, Vol. 1101 (3), 2007)

"This book covers stochastic integration with respect to square-integrable martingales. … I am sure that this book will be very welcomed by students and lectures of this subject … who will find many illustrative exercises provided. Reader also should not miss out on the Preface, which includes some anecdotes about K. Itô." (Thorsten Rheinländer, Journal of the American Statistical Association, Vol. 103 (483), September, 2008)

From the Back Cover

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