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	Nota di contenuto	Chapter 1. Preparations from probability theory -- Chapter 2. Martingale with discrete parameter -- Chapter 3. Martingale with continuous parameter -- Chapter 4. Stochastic integral -- Chapter 5. Applications of stochastic integral -- Chapter 6. Stochastic differential equation -- Chapter 7. Application to finance -- Chapter 8. Appendices -- References.
	Sommario/riassunto	This book is intended for university seniors and graduate students majoring in probability theory or mathematical finance. In the first chapter, results in probability theory are reviewed. Then, it follows a discussion of discrete-time martingales, continuous time square integrable martingales (particularly, continuous martingales of continuous paths), stochastic integrations with respect to continuous local martingales, and stochastic differential equations driven by Brownian motions. In the final chapter, applications to mathematical finance are given. The preliminary knowledge needed by the reader is linear algebra and measure theory. Rigorous proofs are provided for theorems, propositions, and lemmas. In this book, the definition of conditional expectations is slightly different than what is usually found in other textbooks. For the Doob–Meyer decomposition theorem, only square integrable submartingales are considered, and only elementary facts of the square integrable functions are used in the proof. In stochastic differential equations, the Euler–Maruyama approximation is

used mainly to prove the uniqueness of martingale problems and the smoothness of solutions of stochastic differential equations. .