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Autore	Brzezniak Z.
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Nota di contenuto	1. Review of Probability -- 1.1 Events and Probability -- 1.2 Random Variables -- 1.3 Conditional Probability and Independence -- 1.4 Solutions -- 2. Conditional Expectation -- 2.1 Conditioning on an Event -- 2.2 Conditioning on a Discrete Random Variable -- 2.3 Conditioning on an Arbitrary Random Variable -- 2.4 Conditioning on a ?-Field -- 2.5 General Properties -- 2.6 Various Exercises on Conditional Expectation -- 2.7 Solutions -- 3. Martingales in Discrete -- 3.1 Sequences of Random Variables -- 3.2 Filtrations -- 3.3 Martingales -- 3.4 Games of Chance -- 3.5 Stopping Times -- 3.6 Optional Stopping Theorem -- 3.7 Solutions -- 4. Martingale Inequalities and Convergence -- 4.1 Doob’s Martingale Inequalities -- 4.2 Doob’s Martingale Convergence Theorem -- 4.3 Uniform Integrability and L1 Convergence of Martingales -- 4.4 Solutions -- 5. Markov Chains -- 5.1 First Examples and Definitions -- 5.2 Classification of States -- 5.3 Long-Time Behaviour of Markov Chains: General Case -- 5.4 Long-Time Behaviour of MarkovChains with Finite State Space -- 5.5 Solutions -- 6. Stochastic Processes in Continuous Time -- 6.1 General Notions -- 6.2 Poisson Process -- 6.3 Brownian

Motion -- 6.4 Solutions -- 7. Itô Stochastic Calculus -- 7.1 Itô Stochastic Integral: Definition -- 7.2 Examples -- 7.3 Properties of the Stochastic Integral -- 7.4 Stochastic Differential and Itô Formula -- 7.5 Stochastic Differential Equations -- 7.6 Solutions.

Sommario/riassunto

This book has been designed for a final year undergraduate course in stochastic processes. It will also be suitable for mathematics undergraduates and others with interest in probability and stochastic processes, who wish to study on their own. The main prerequisite is probability theory: probability measures, random variables, expectation, independence, conditional probability, and the laws of large numbers. The only other prerequisite is calculus. This covers limits, series, the notion of continuity, differentiation and the Riemann integral. Familiarity with the Lebesgue integral would be a bonus. A certain level of fundamental mathematical experience, such as elementary set theory, is assumed implicitly. Throughout the book the exposition is interlaced with numerous exercises, which form an integral part of the course. Complete solutions are provided at the end of each chapter. Also, each exercise is accompanied by a hint to guide the reader in an informal manner. This feature willbe particularly useful for self-study and may be of help in tutorials. It also presents a challenge for the lecturer to involve the students as active participants in the course.