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Autore	Cufaro Petroni Nicola
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Nota di contenuto	Part 1: Probability -- Chapter 1. Probability spaces -- Chapter 2. Distributions -- Chapter 3. Random variables -- Chapter 4. Limit theorems -- Part 2: Stochastic Processes -- Chapter 5. General notions -- Chapter 6. Heuristic denitions -- Chapter 7. Markovianity -- Chapter 8. An outline of stochastic calculus -- Part 3: Physical modeling -- Chapter 9. Dynamical theory of Brownian motion -- Chapter 10. Stochastic mechanics -- Part 4: Appendices -- A Consistency (Sect. 2.3.4) -- B Inequalities (Sect. 3.3.2) -- C Bertrand’s paradox (Sect. 3.5.1) -- D Lp spaces of rv’s (Sect. 4.1) -- E Moments

and cumulants (Sect. 4.2.1) -- F Binomial limit theorems (Sect. 4.3) -- G Non uniform point processes (Sect 6.1.1) -- H Stochastic calculus paradoxes (Sect. 6.4.2) -- I Pseudo-Markovian processes (Sect. 7.1.2) -- J Fractional Brownian motion (Sect. 7.1.10) -- K Ornstein-Uhlenbeck equations (Sect. 7.2.4) -- L Stratonovich integral (Sect. 8.2.2) -- M Stochastic bridges (Sect. 10.2) -- N Kinematics of Gaussian diusions (Sect. 10.3.1) -- O Substantial operators (Sect. 10.3.3) -- P Constant diusion coecients (Sect. 10.4).

Sommario/riassunto

This book seeks to bridge the gap between the parlance, the models, and even the notations used by physicists and those used by mathematicians when it comes to the topic of probability and stochastic processes. The opening four chapters elucidate the basic concepts of probability, including probability spaces and measures, random variables, and limit theorems. Here, the focus is mainly on models and ideas rather than the mathematical tools. The discussion of limit theorems serves as a gateway to extensive coverage of the theory of stochastic processes, including, for example, stationarity and ergodicity, Poisson and Wiener processes and their trajectories, other Markov processes, jump-diffusion processes, stochastic calculus, and stochastic differential equations. All these conceptual tools then converge in a dynamical theory of Brownian motion that compares the Einstein–Smoluchowski and Ornstein–Uhlenbeck approaches, highlighting the most important ideas that finally led to a connection between the Schrödinger equation and diffusion processes along the lines of Nelson’s stochastic mechanics. A series of appendices cover particular details and calculations, and offer concise treatments of particular thought-provoking topics.