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Nota di contenuto	Physics of Stochastic Processes -- Contents -- Preface -- Part I Basic Mathematical Description -- 1 Fundamental Concepts -- 1.1 Wiener Process, Adapted Processes and Quadratic Variation -- 1.2 The Space of Square Integrable Random Variables -- 1.3 The Ito Integral and the Ito Formula -- 1.4 The Kolmogorov Differential Equation and the Fokker-Planck Equation -- 1.5 Special Diffusion Processes -- 1.6 Exercises -- 2 Multidimensional Approach -- 2.1 Bounded Multidimensional Region -- 2.2 From Chapman-Kolmogorov Equation to Fokker-Planck Description -- 2.2.1 The Backward Fokker-Planck Equation -- 2.2.2 Boundary Singularities -- 2.2.3 The Forward Fokker-Planck Equation -- 2.2.4 Boundary Relations -- 2.3 Different Types of Boundaries -- 2.4 Equivalent Lattice Representation of Random Walks Near the Boundary -- 2.4.1 Diffusion Tensor Representations -- 2.4.2 Equivalent Lattice Random Walks -- 2.4.3 Properties of the Boundary

Layer -- 2.5 Expression for Boundary Singularities -- 2.6 Derivation of Singular Boundary Scaling Properties -- 2.6.1 Moments of the Walker Distribution and the Generating Function -- 2.6.2 Master Equation for Lattice Random Walks and its General Solution -- 2.6.3 Limit of Multiple-Step Random Walks on Small Time Scales -- 2.6.4 Continuum Limit and a Boundary Model -- 2.7 Boundary Condition for the Backward Fokker-Planck Equation -- 2.8 Boundary Condition for the Forward Fokker-Planck Equation -- 2.9 Concluding Remarks -- 2.10 Exercises -- Part II Physics of Stochastic Processes -- 3 The Master Equation -- 3.1 Markovian Stochastic Processes -- 3.2 The Master Equation -- 3.3 One-Step Processes in Finite Systems -- 3.4 The First-Passage Time Problem -- 3.5 The Poisson Process in Closed and Open Systems -- 3.6 The Two-Level System -- 3.7 The Three-Level System -- 3.8 Exercises -- 4 The Fokker-Planck Equation.
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Sommario/riassunto

Based on lectures given by one of the authors with many years of experience in teaching stochastic processes, this textbook is unique in combining basic mathematical and physical theory with numerous simple and sophisticated examples as well as detailed calculations. In addition, applications from different fields are included so as to strengthen the background learned in the first part of the book. With its exercises at the end of each chapter (and solutions only available to lecturers) this book will benefit students and researchers at different educational levels. Solutions manual available for lecturers on www.wiley-vch.de.