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2.2 Classification of Stochastic Processes2.3 Mean and Autocorrelation Function; 2.4 Stationary Processes; 2.4.1 Strict-Sense Stationary Processes; 2.4.2 Wide-Sense Stationary Processes; 2.5 Power Spectral Density; 2.6 Counting Processes; 2.7 Independent Increment Processes; 2.8 Stationary Increment Process; 2.9 Poisson Processes; 2.9.1 Compound Poisson Process; 2.10 Markov Processes; 2.10.1 Discrete-Time Markov Chains; 2.10.2 State Transition Probability Matrix; 2.10.3 The k-Step State Transition Probability; 2.10.4 State Transition Diagrams; 2.10.5 Classification of States
2.10.6 Limiting-State Probabilities2.10.7 Doubly Stochastic Matrix; 2.10.8 Continuous-Time Markov Chains; 2.10.9 Birth and Death Processes; 2.11 Gaussian Processes; 2.12 Martingales; 2.12.1 Stopping Times; Problems; 3 One-Dimensional Random Walk; 3.1 Introduction; 3.2 Occupancy Probability; 3.3 Random Walk as a Markov Chain; 3.4 Symmetric Random Walk as a Martingale; 3.5 Random Walk with Barriers; 3.6 Mean-Square Displacement; 3.7 Gambler's Ruin; 3.7.1 Ruin Probability; 3.7.2 Alternative Derivation of Ruin Probability; 3.7.3 Duration of a Game; 3.8 Random Walk with Stay
3.9 First Return to the Origin3.10 First Passage Times for Symmetric Random Walk; 3.10.1 First Passage Time via the Generating Function; 3.10.2 First Passage Time via the Reflection Principle; 3.10.3 Hitting Time and the Reflection Principle; 3.11 The Ballot Problem and the Reflection Principle; 3.11.1 The Conditional Probability Method; 3.12 Returns to the Origin and the Arc-Sine Law; 3.13 Maximum of a Random Walk; 3.14 Two Symmetric Random Walkers; 3.15 Random Walk on a Graph; 3.15.1 Proximity Measures; 3.15.2 Directed Graphs; 3.15.3 Random Walk on an Undirected Graph
3.15.4 Random Walk on a Weighted Graph

Sommario/riassunto

"Featuring an introduction to stochastic calculus, this book uniquely blends diffusion equations and random walk theory and provides an interdisciplinary approach by including numerous practical examples and exercises with real-world applications in operations research, economics, engineering, and physics. It covers standard methods and applications of Brownian motion and discusses Levy motion; addresses fractional calculus; introduces percolation theory and its relationship to diffusion processes; and more"--