Nicolas Privault

Understanding Markov Chains

Examples and Applications

Series: Springer Undergraduate Mathematics Series

- Easily accessible to both mathematics and non-mathematics majors who are taking an introductory course on Stochastic Processes
- Filled with numerous exercises to test students' understanding of key concepts
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This book provides an undergraduate-level introduction to discrete and continuous-time Markov chains and their applications, with a particular focus on the first step analysis technique and its applications to average hittingtimes and ruin probabilities. It also discusses classical topics such as recurrence and transience,stationary and limiting distributions, as well as branching processes. It first examines in detail two important examples (gambling processes and random walks) before presenting the general theory itself in the subsequent chapters. It also provides an introduction to discrete-time martingalesand their relation to ruin probabilities and mean exit times, together with a chapter on spatial Poisson processes. The conceptspresented are illustrated by examples, 138 exercises and 9 problemswith their solutions.

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