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Descrizione fisica	1 online resource (XVIII, 757 p. 424 illus., 1 illus. in color.)
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Disciplina	519.24
Soggetti	Probabilities Probability Theory and Stochastic Processes
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Part I Foundations -- Markov Chains: Basic Definitions -- Examples of Markov Chains -- Stopping Times and the Strong Markov Property -- Martingales, Harmonic Functions and Polsson-Dirichlet Problems -- Ergodic Theory for Markov Chains -- Part II Irreducible Chains: Basics -- Atomic Chains -- Markov Chains on a Discrete State Space -- Convergence of Atomic Markov Chains -- Small Sets, Irreducibility and Aperiodicity -- Transience, Recurrence and Harris Recurrence -- Splitting Construction and Invariant Measures -- Feller and T-kernels -- Part III Irreducible Chains: Advanced Topics -- Rates of Convergence for Atomic Markov Chains -- Geometric Recurrence and Regularity -- Geometric Rates of Convergence -- (f, r)-recurrence and Regularity -- Subgeometric Rates of Convergence -- Uniform and V-geometric Ergodicity by Operator Methods -- Coupling for Irreducible Kernels -- Part IV Selected Topics -- Convergence in the Wasserstein Distance -- Central Limit Theorems -- Spectral Theory -- Concentration Inequalities -- Appendices -- A Notations -- B Topology, Measure, and Probability -- C Weak Convergence -- D Total and V-total Variation Distances -- E Martingales -- F Mixing Coefficients -- G Solutions to Selected Exercises.
Sommario/riassunto	This book covers the classical theory of Markov chains on general state-spaces as well as many recent developments. The theoretical

results are illustrated by simple examples, many of which are taken from Markov Chain Monte Carlo methods. The book is self-contained while all the results are carefully and concisely proven. Bibliographical notes are added at the end of each chapter to provide an overview of the literature. Part I lays the foundations of the theory of Markov chain on general state-spaces. Part II covers the basic theory of irreducible Markov chains starting from the definition of small and petite sets, the characterization of recurrence and transience and culminating in the Harris theorem. Most of the results rely on the splitting technique which allows to reduce the theory of irreducible to a Markov chain with an atom. These two parts can serve as a text on Markov chain theory on general state-spaces. Although the choice of topics is quite different from what is usually covered in a classical Markov chain course, where most of the emphasis is put on countable state space, a graduate student should be able to read almost all of these developments without any mathematical background deeper than that needed to study countable state space (very little measure theory is required). Part III deals with advanced topics on the theory of irreducible Markov chains, covering geometric and subgeometric convergence rates. Special attention is given to obtaining computable convergence bounds using Foster-Lyapunov drift conditions and minorization techniques. Part IV presents selected topics on Markov chains, covering mostly hot recent developments. It represents a biased selection of topics, reflecting the authors own research inclinations. This includes quantitative bounds of convergence in Wasserstein distances, spectral theory of Markov operators, central limit theorems for additive functionals and concentration inequalities. Some of the results in Parts III and IV appear for the first time in book form and some are original.