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Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Part I Introduction -- 1.Background and motivation -- 2.Aims and scopes -- Part II Markov processes 3.Some basic notions from probability theory -- 4.Markov processes in discrete time -- 5.Markov processes in continuous time -- 6.Large deviations -- 7.Potential theory -- Part III Metastability -- 8.Key definitions and basic properties -- 9.Basic techniques -- Part IV Applications: Diffusions with small noise -- 10.Discrete reversible diffusions -- 11.Diffusion processes with gradient drift -- 12.Stochastic partial differential equations -- Part V Applications: Coarse-graining at positive temperatures -- 13.The Curie-Weiss model -- 14.The Curie-Weiss model with a random magnetic field: discrete distributions -- 15.The Curie-Weiss model with random magnetic field: continuous distributions -- Part VI Applications: Lattice systems in small volumes at low temperatures -- 16.Abstract set-up and metastability in the zero-temperature limit -- 17.Glauber dynamics -- 18.Kawasaki dynamics -- Part VII Applications: Lattice systems in large volumes at low temperatures -- 19.Glauber dynamics -- 20.Kawasaki dynamics -- Part VIII Applications: Lattice systems in small volumes at high densities -- 21.The zero-range

process -- Part IX Challenges -- 22.Challenges within metastability -- 23.Challenges beyond metastability -- References.-Glossary -- Index. .

Sommario/riassunto

Metastability is a wide-spread phenomenon in the dynamics of non-linear systems - physical, chemical, biological or economic - subject to the action of temporal random forces typically referred to as noise. This monograph provides a concise presentation of mathematical approach to metastability based on potential theory of reversible Markov processes. The authors shed new light on the metastability phenomenon as a sequence of visits of the path of the process to different metastable sets, and focus on the precise analysis of the respective hitting probabilities and hitting times of these sets. The theory is illustrated with many examples, ranging from finite-state Markov chains, finite-dimensional diffusions and stochastic partial differential equations, via mean-field dynamics with and without disorder, to stochastic spin-flip and particle-hopping dynamics and probabilistic cellular automata, unveiling the common universal features of these systems with respect to their metastable behaviour. The monograph will serve both as comprehensive introduction and as reference for graduate students and researchers interested in metastability.