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Nota di contenuto	Contents ; Preface ; 1 Introduction ; 1.1. Some Basic Concepts of Stochastic Processes and Examples ; 1.2. Markovian and Non-Markovian Processes Markov Chains and Examples ; 1.3. Diffusion Processes and Examples ; 1.4. State Space Models and Hidden Markov Models 1.5. The Scope of the Book 1.6. Complements and Exercises ; References ; 2 Discrete Time Markov Chain Models in Genetics and Biomedical Systems ; 2.1. Examples from Genetics and AIDS ; 2.2. The Transition Probabilities and Computation 2.3. The Structure and Decomposition of Markov Chains 2.4. Classification of States and the Dynamic Behavior of Markov Chains ; 2.5. The Absorption Probabilities of Transient States ; 2.5.1. The case when CT is finite ; 2.5.2. The case when CT is infinite 2.6. The Moments of First Absorption Times

2.6.1. The case when CT is finite ; 2.7. Some  
 Illustrative Examples ; 2.8. Finite Markov  
 Chains ; 2.8.1. The canonical form of transition  
 matrix ; 2.8.2. Absorption  
 probabilities of transient states in finite Markov chains  
 2.9. Stochastic Difference Equation for Markov Chains With Discrete  
 Time 2.9.1.  
 Stochastic difference equations for finite Markov chains  
 ; 2.9.2. Markov chains in the HIV epidemic in homosexual or IV drug  
 user populations  
 ; 2.10. Complements and Exercises ; 2.11.  
 Appendix  
 2.11.1. The Hardy-Weinberg law in population genetics

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## Sommario/riassunto

This book presents a systematic treatment of Markov chains, diffusion processes and state space models, as well as alternative approaches to Markov chains through stochastic difference equations and stochastic differential equations. It illustrates how these processes and approaches are applied to many problems in genetics, carcinogenesis, AIDS epidemiology and other biomedical systems. One feature of the book is that it describes the basic MCMC (Markov chain and Monte Carlo) procedures and illustrates how to use the Gibbs sampling method and the multilevel Gibbs sampling method to solve man

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