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of Markov Modeling; 3.1. Markov models: ideas, history, applications; 3.2. The discrete-time Ehrenfest model; 3.2.1. The microscopic chain; 3.2.2. The macroscopic chain; 3.2.3. Some characteristics of the Ehrenfest model
3.2.4. The discrete-time Ehrenfest model: history, generalizations, similar models3.3. Markov models in genetics; 3.3.1. Laws of heredity and mathematics; 3.3.2. Haploid models; 3.3.3. Models with two genotypes and without mutations; 3.3.4. Models with several genotypes and without mutations; 3.3.5. Models with two genotypes and mutations; 3.3.6. Models with several genotypes and mutations; 3.3.7. Models with partitioned population; 3.3.8. Genealogy models for large size populations; 3.4. Markov storage models; 3.4.1. Discrete-time models; 3.4.2. Continuous-time models
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4.10. Regenerative processesChapter 5. Semi-Markov Models; 5.1. Introduction; 5.2. Markov renewal processes; 5.2.1. Definitions; 5.2.2. Markov renewal theory; 5.3. First-passage times and state classification; 5.3.1. Stationary distribution and asymptotic results; 5.4. Reliability; 5.5. Reservoir models; 5.5.1. Model I; 5.5.2. Model II; 5.6. Queues; 5.6.1. The G/M/1 queue; 5.6.2. The M/G/1 queue; 5.7. Digital communication channels; Chapter 6. Branching Models; 6.1. The Bienayme-Galton-Watson model; 6.1.1. Historical considerations; 6.1.2. Some elementary results; 6.1.3. A fundamental example
6.1.4. Extinction probability: critical theorem

Sommario/riassunto

This book provides a pedagogical examination of the way in which stochastic models are encountered in applied sciences and techniques such as physics, engineering, biology and genetics, economics and social sciences. It covers Markov and semi-Markov models, as well as their particular cases: Poisson, renewal processes, branching processes, Ehrenfest models, genetic models, optimal stopping, reliability, reservoir theory, storage models, and queuing systems. Given this comprehensive treatment of the subject, students and researchers in applied sciences, as well as anyone looking for an introduc