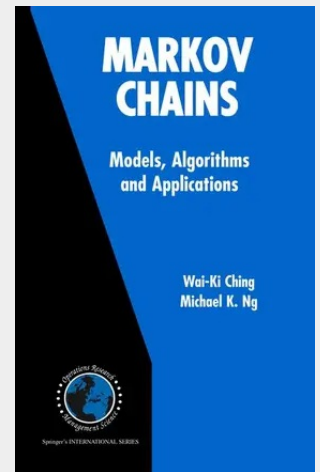


## Markov Chains: Models, Algorithms and Applications

Markov chains are a particularly powerful and widely used tool for analyzing a variety of stochastic (probabilistic) systems over time. This monograph will present a series of Markov models, starting from the basic models and then building up to higher-order models. Included in the higher-order discussions are multivariate models, higher-order multivariate models, and higher-order hidden models. In each case, the focus is on the important kinds of applications that can be made with the class of models being considered in the current chapter. Special attention is given to numerical algorithms that can efficiently solve the models. Therefore, Markov Chains: Models, Algorithms and Applications outlines recent developments of Markov chain models for modeling queueing sequences, Internet, re-manufacturing systems, reverse logistics, inventory systems, bio-informatics, DNA sequences, genetic networks, data mining, and many other practical systems.

MARKOV CHAINS: Models, Algorithms and Applications outlines recent developments of Markov chain models for modeling queueing sequences, Internet, re-manufacturing systems, reverse logistics, inventory systems, bio-informatics, DNA sequences, genetic networks, data mining, and many other practical systems. The book consists of eight chapters. Chapter 1 is a brief introduction to the classical theory on both discrete and continuous time Markov chains. The relationship between Markov chains of finite states and matrix theory is also discussed. Chapter 2 discusses the applications of continuous time Markov chains to model queueing systems and discrete time Markov chains for computing. Chapter 3 studies re-manufacturing systems and presents Markovian models for reverse manufacturing applications. In Chapter 4, Hidden Markov models are applied to classify customers. Chapter 5 discusses the Markov decision process for customer lifetime values. Customer Lifetime Values (CLV) is an important concept and quantity in marketing management. Chapter 6 covers higher-order Markov chain models. Multivariate Markov models are discussed in Chapter 7. It presents a class of multivariate Markov chain models with a lower order of model parameters. Chapter 8 studies higher-order hidden Markov models. It proposes a class of higher-order hidden Markov models with an efficient algorithm for solving the model parameters. This book is aimed at students, professionals, practitioners, and researchers in applied mathematics, scientific computing, and operational research, who are interested in the formulation and computation of queueing and manufacturing systems.



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