

<<马尔科夫过程导论>>

图书基本信息

书名：<<马尔科夫过程导论>>

13位ISBN编号：9787510004483

10位ISBN编号：7510004489

出版时间：2009-4

出版时间：世界图书出版公司

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页数：171

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前言

To some extent, it would be accurate to summarize the contents of this book as an intolerably protracted description of what happens when either one raises a transition probability matrix P (i.e. all entries of P are non-negative and each row of P sums to 1) to higher and higher powers or one exponentiates $R = P - I$, where R is a diagonal matrix with non-negative entries. Indeed, when it comes right down to it, that is all that is done in this book. However, I, and others of my ilk, would take offense at such a dismissive characterization of the theory of Markov chains and processes with values in a countable state space, and a primary goal of mine in writing this book was to convince its readers that our offense would be warranted. The reason why I, and others of my persuasion, refuse to consider the theory here as no more than a subset of matrix theory is that to do so is to ignore the pervasive role that probability plays throughout. Namely, probability theory provides a model which both motivates and provides a context for what we are doing with these matrices. To wit, even the term "transition probability matrix" lends meaning to an otherwise rather peculiar set of hypotheses to make about a matrix. Namely, it suggests that we think of the matrix entry $(P)_{ij}$ as giving the probability that, in one step, a system in state i will make a transition to state j . Moreover, if we adopt this interpretation for $(P)_{ij}$, then we must interpret the entry $(P)_{ii}$ of P as the probability of the same transition in one step. Thus, as P is encoding the long time behavior of a randomly evolving system for which P encodes the one-step behavior, and, as we will see, this interpretation will guide us to an understanding of $\lim_{n \rightarrow \infty} P^n$. In addition, and perhaps even more important, is the role that probability plays in bridging the chasm between mathematics and the rest of the world. Indeed, it is the probabilistic metaphor which allows one to formulate mathematical models of various phenomena observed in both the natural and social sciences. Without the language of probability, it is hard to imagine how one would go about connecting such phenomena to P .

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内容概要

To some extent , it would be accurate to summarize the contents of this book as an intolerably protracted description of what happens when either one raises a transition probability matrix P (i.e. , all entries $(P)_{ij}$ are nonnegative and each row of P sums to 1) to higher and higher powers or one exponentiates $R(P - I)$, where R is a diagonal matrix with non-negative entries. Indeed , when it comes right down to it , that is all that is done in this book. However , I , and others of my ilk , would take offense at such a dismissive characterization of the theory of Markov chains and processes with values in a countable state space , and a primary goal of mine in writing this book was to convince its readers that our offense would be warranted

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书籍目录

Preface . . . Chapter 1 Random Walks A Good Place to Begin 1 . 1 . Nearest Neighbor Random Walks on Z .
 1 . 1 . 1 . Distribution at Time n 1 . 1 . 2 . Passage Times via the Reflection Principle . 1 . 1 . 3
 . Some Related Computations 1 . 1 . 4 . Time of First Return 1 . 1 . 5 . Passage Times via Functional
 Equations 1 . 2 . Recurrence Properties of Random Walks 1 . 2 . 1 . Random Walks on Z^d 1 . 2 . 2
 . An Elementary Recurrence Criterion 1 . 2 . 3 . Recurrence of Symmetric Random Walk in Z^2 1 . 2 . 4
 . Transience in Z^3 1 . 3 . Exercises Chapter 2 Doeblin ' S Theory for Markov Chains 2 . 1 . Some
 Generalities 2 . 1 . 1 . Existence of Markov Chains 2 . 1 . 2 . Transition Probabilities & Probability
 Vectors 2 . 1 . 3 . Transition Probabilities and Functions . 2 . 1 . 4 . The Markov Property 2 . 2
 . Doeblin ' S Theory . 2 . 2 . 1 . Doeblin ' S Basic Theorem 2 . 2 . 2 . A Couple of Extensions 2
 . 3 . Elements of Ergodic Theory 2 . 3 . 1 . The Mean Ergodic Theorem 2 . 3 . 2 . Return Times 2
 . 3 . 3 . Identification of 2 . 4 . Exercises Chapter 3 More about the Ergodic Theory of Markov Chains 3
 . 1 . Classification of States 3 . 1 . 1 . Classification , Recurrence , and Transience 3 . 1 . 2 . Criteria
 for Recurrence and Transience 3 . 1 . 3 . Periodicity . 3 . 2 . Ergodic Theory without Doeblin 3 . 2 . 1
 . Convergence of Matrices . 3 . 2 . 2 . Abel Convergence 3 . 2 . 3 . Structure of Stationary
 Distributions 3 . 2 . 4 . A Small Improvement 3 . 2 . 5 . The Mean Ergodic Theorem Again 3 . 2
 . 6 . A Refinement in The Aperiodic Case 3 . 2 . 7 . Periodic Structure 3 . 3 . Exercises Chapter 4 Markov
 Processes in Continuous Time 4 . 1 . Poisson Processes . 4 . 1 . 1 . The Simple Poisson Process . 4
 . 1 . 2 . Compound Poisson Processes on Z 4 . 2 . Markov Processes with Bounded Rates 4 . 2 . 1 . Basic
 Construction 4 . 2 . 2 . The Markov Property 4 . 2 . 3 . The Q —Matrix and Kolmogorov ' S
 Backward Equation . 4 . 2 . 4 . Kolmogorov ' S Forward Equation 4 . 2 . 5 . Solving Kolmogorov ' S
 Equation 4 . 2 . 6 . A Markov Process from its Infinitesimal Characteristics 4 . 3 . Unbounded Rates 4
 . 3 . 1 . Explosion 4 . 3 . 2 . Criteria for Non . explosion or Explosion 4 . 3 . 3 . What to Do When
 Explosion Occurs . 4 . 4 . Ergodic Properties . 4 . 4 . 1 . Classification of States . 4 . 4 . 2
 . Stationary Measures and Limit Theorems 4 . 4 . 3 . Interpreting ii . 4 . 5 . Exercises Chapter 5
 Reversible Markov Processes 5 . 1 . Reversible Markov Chains 5 . 1 . 1 . Reversibility from Invariance
 5 . 1 . 2 . Measurements in Quadratic Mean 5 . 1 . 3 . The Spectral Gap . 5 . 1 . 4 . Reversibility and
 Periodicity 5 . 1 . 5 . Relation to Convergence in Variation 5 . 2 . Dirichlet Forms and Estimation of
 5 . 2 . 1 . The Dirichlet Form and Poincaré ' S Inequality , 5 . 2 . 2 . Estimating λ + 5 . 2 . 3
 . Estimating λ - 5 . 3 . Reversible Markov Processes in Continuous Time 5 . 3 . 1 . Criterion for
 Reversibility 5 . 3 . 2 . Convergence in $L^2(\cdot)$ for Bounded Rates 5 . 3 . 3 . $L^2(\cdot)$ Convergence Rate in
 General Chapter 6 Some Mild Measure Theory Notation References Index

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