

<<马尔科夫过程导论>>

图书基本信息

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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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