Lecture Notes Markov Chains

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Counting, Sampling and Integrating: Algorithms and Complexity
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Lectures on Formal Methods and Performance Analysis
Semi-Markov Chains and Hidden Semi-Markov Models toward Applications
Random Walks and Electric Networks
Non-negative Matrices and Markov Chains
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Lectures on Probability Theory and Statistics
Interactive Markov Chains
Numerical Methods in Markov Chains and Bulk Queues
Symmetric Markov Processes

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Markov Processes, Brownian Motion, and Time Symmetry Birkhäuser This is a thorough and accessible exposition on the functional analytic approach to the problem of construction

of Markov processes with Ventcel' boundary conditions in probability theory. It presents new developments in the theory of singular integrals.

Lectures on the Coupling Method

Springer Science & Business Media

Traditionally, models and methods for the analysis of the functional correctness of reactive systems, and those for the analysis of their performance (and - pendability) aspects, have been studied by di?erent research communities. This has resulted in the development of successful, but distinct and largely unrelated modeling and analysis techniques for both domains. In many modern systems, however, the di?erence between their functional features and their performance properties has become blurred, as relevant functionalities become inextricably linked to performance aspects, e.g. isochronous data transfer for live video tra- mission. During the last decade, this trend has motivated an increased interest in c- bining insights and results from the ?eld of formal methods – traditionally - cused on functionality – with techniques for performance modeling and analysis. Prominent examples of this cross-fertilization

are extensions of process algebra and Petri nets that allow for the automatic generation of performance models, the use of formal proof techniques to assess the correctness of randomized - gorithms, and extensions of model checking techniques to analyze performance requirements automatically. We believe that these developments markthe - ginning of a new paradigm for the modeling and analysis of systems in which qualitative and quantitative aspects are studied from an integrated perspective. We are convinced that the further worktowards the realization of this goal will be a growing source of inspiration and progress for both communities. Lectures from Markov Processes to Brownian Motion Springer Science & Business Media This accessible introduction to the theory of stochastic processes emphasizes Levy processes and Markov processes. It gives a thorough treatment of the decomposition of paths of processes with independent increments (the Lévy-Itô decomposition). It also contains a detailed treatment of time-homogeneous Markov processes from the viewpoint of

probability measures on path space. In addition, 70 exercises and their complete solutions are included.

Stability Problems for Stochastic Models

Springer Science & Business Media

From the reviews of the First Edition: "This excellent book is based on several sets of lecture notes written over a decade and has its origin in a one-semester course given by the author at the ETH, Zürich, in the spring of 1970. The author's aim was to present some of the best features of Markov processes and, in particular, of Brownian motion with a minimum of prerequisites and technicalities. The reader who becomes acquainted with the volume cannot but agree with the reviewer that the author was very successful in accomplishing this goal...The volume is very useful for people who wish to learn Markov processes but it seems to the reviewer that it is also of great interest to specialists in this area who could derive much stimulus from it. One can be convinced that it will receive wide circulation." (Mathematical Reviews) This new edition contains 9 new chapters which include new exercises, references, and multiple corrections throughout the original text.

Markov Chains

Cambridge University Press
This book provides an undergraduate introduction to discrete and continuous-time Markov chains and their applications. A large focus is placed on the first step analysis technique and its applications to average hitting times and ruin probabilities. Classical topics such as recurrence and transience, stationary and limiting distributions, as well as branching processes, are also covered. Two major examples (gambling processes and random walks) are treated in detail from the beginning, before the general theory itself is presented in the subsequent chapters. An introduction to discrete-time martingales and their relation to ruin probabilities and mean exit times is also provided, and the book includes a chapter on spatial Poisson processes with some recent results on moment identities and deviation inequalities for Poisson stochastic integrals. The concepts presented are illustrated by examples and by 72 exercises and their complete solutions.
Dependability for Systems with a Partitioned State Space
Imperial College Press
This textbook has been developed from the lecture notes for a one-

semester course on stochastic modelling. It reviews the basics of probability theory and then covers the following topics: Markov chains, Markov decision processes, jump Markov processes, elements of queueing theory, basic renewal theory, elements of time series and simulation. Rigorous proofs are often replaced with sketches of arguments ? with indications as to why a particular result holds, and also how it is connected with other results ? and illustrated by examples. Wherever possible, the book includes references to more specialised texts containing both proofs and more advanced material related to the topics covered.

Lectures on Probability Theory and Statistics

World Scientific Practical and easy-to-use reference progresses from simple to advanced topics, covering, among other topics, renewal theory, Markov chains, Poisson approximation , ergodicity, and Strassen's theorem. 1992 edition.

Essentials of Stochastic Processes

Springer Science & Business Media

"These papers were presented and developed as expository talks at a

summer-long workshop on Stein's method at Stanford's Department of Statistics in 1998."--P. iii.

Elements of Stochastic Modelling
Springer Science & Business Media
Nur Contents aufnehmen

Markov Chains
John Wiley & Sons
This book evolved from several stacks of lecture notes written over a decade and given in classes at slightly varying levels. In transforming the over lapping material into a book, I aimed at presenting some of the best features of the subject with a minimum of prerequisities and technicalities. (Needless to say, one man's technicality is another's professionalis m.) But a text frozen in print does not allow for the latitude of the classroom; and the tendency to expand becomes harder to curb without the constraints of time and audience. The result is that this volume contains more topics and details than I had intended, but I hope the forest is still visible with the trees. The book begins at the beginning with the Markov property, followed quickly by the introduction of option al times and martingales. These three topics in the discrete parameter setting are fully discussed in my book A Course In Probability

Theory (second edition, Academic Press, 1974). The latter will be referred to throughout this book as the Course, and may be considered as a general background; its specific use is limited to the mate rial on discrete parameter martingale theory cited in § 1. 4. Apart from this and some dispensable references to Markov chains as examples, the book is self-contained.

Labelled Markov Processes Birkhäuser Probabilistic models of technical systems are studied here whose finite state space is partitioned into two or more subsets. The systems considered are such that each of those subsets of the state space will correspond to a certain performance level of the system. The crudest approach differentiates between 'working' and 'failed' system states only. Another, more sophisticated, approach will differentiate between the various levels of redundancy provided by the system. The dependability characteristics examined here are random variables associated with the state space's partitioned structure; some typical ones are as follows • The sequence of the lengths of the system's working periods; • The sequences of the times spent by the system at the

various performance levels; • The cumulative time spent by the system in the set of working states during the first m working periods; • The total cumulative 'up' time of the system until final breakdown; • The number of repair events during a fmite time interval; • The number of repair events until final system breakdown; • Any combination of the above. These dependability characteristics will be discussed within the Markov and semi-Markov frameworks.

Stochastic Processes

Springer Science & Business Media

Since its inception by Perron and Frobenius, the theory of non-negative matrices has developed enormously and is now being used and extended in applied fields of study as diverse as probability theory, numerical analysis, demography, mathematical economics, and dynamic programming, while its development is still proceeding rapidly as a branch of pure mathematics in its own right. While there are books which cover this or that aspect of the theory, it is nevertheless not uncommon for workers in one or another branch of its development to be unaware of what is known in other branches,

even though there is often formal overlap. One of the purposes of this book is to relate several aspects of the theory, insofar as this is possible. The author hopes that the book will be useful to mathematicians; but in particular to the workers in applied fields, so the mathematics has been kept as simple as could be managed. The mathematical requisites for reading it are: some knowledge of real-variable theory, and matrix theory; and a little knowledge of complex-variable; the emphasis is on real-variable methods. (There is only one part of the book, the second part of 55.5, which is of rather specialist interest, and requires deeper knowledge.) Appendices provide brief expositions of those areas of mathematics needed which may be less g-erally known to the average reader.

Introduction to Markov Chains

Springer Besides a series of six articles on Lévy processes, Volume 38 of the Séminaire de Probabilités contains contributions whose topics range from analysis of semi-groups to free probability, via martingale theory, Wiener space and Brownian motion, Gaussian processes and matrices, diffusions and their applications to PDEs. As do all

previous volumes of this series, it provides an overview on the current state of the art in the research on stochastic processes.
Boundary Value Problems and Markov Processes
Springer Science & Business Media
The present lecture notes aim for an introduction to the ergodic behaviour of Markov Processes and addresses graduate students, post-graduate students and interested readers. Different tools and methods for the study of upper bounds on uniform and weak ergodic rates of Markov Processes are introduced. These techniques are then applied to study limit theorems for functionals of Markov processes. This lecture course originates in two mini courses held at University of Potsdam, Technical University of Berlin and Humboldt University in spring 2013 and Ritsumameikan University in summer 2013. Alexei Kulik, Doctor of Sciences, is a Leading researcher at the Institute of Mathematics of Ukrainian National Academy of Sciences.
Probability Towards 2000
Springer
This is a brief introduction to stochastic processes studying certain elementary continuous-time processes.

The text describes the Poisson process and related processes with independent increments as well as a brief look at Markov processes with a finite number of jumps.

Markov Paths, Loops and Fields

Springer

The subject of this book is a new direction in the field of probability theory and mathematical statistics which can be called "stability theory": it deals with evaluating the effects of perturbing initial probabilistic models and embraces quite varied subtopics: limit theorems, queueing models, statistical inference, probability metrics, etc. The contributions are original research articles developing new ideas and methods of stability analysis.

Stochastic Processes

American Mathematical Soc.

Markov Chain Monte Carlo (MCMC) originated in statistical physics, but has spilled over into various application areas, leading to a corresponding variety of techniques and methods. That variety stimulates new ideas and developments from many different places, and there is much to be gained from cross-fertilization. This book presents five expository essays by leaders in the field, drawing

from perspectives in physics, statistics and genetics, and showing how different aspects of MCMC come to the fore in different contexts. The essays derive from tutorial lectures at an interdisciplinary program at the Institute for Mathematical Sciences, Singapore, which exploited the exciting ways in which MCMC spreads across different disciplines. Probability Theory Springer Science & Business Media Building upon the previous editions, this textbook is a first course in stochastic processes taken by undergraduate and graduate students (MS and PhD students from math, statistics, economics, computer science, engineering, and finance departments) who have had a course in probability theory. It covers Markov chains in discrete and continuous time, Poisson processes, renewal processes, martingales, and option pricing. One can only learn a subject by seeing it in action, so there are a large number of examples and more than 300 carefully chosen exercises to deepen the reader's understanding. Drawing from teaching experience and student feedback, there are many new examples and problems with

solutions that use TI-83 to eliminate the tedious details of solving linear equations by hand, and the collection of exercises is much improved, with many more biological examples. Originally included in previous editions, material too advanced for this first course in stochastic processes has been eliminated while treatment of other topics useful for applications has been expanded. In addition, the ordering of topics has been improved; for example, the difficult subject of martingales is delayed until its usefulness can be applied in the treatment of mathematical finance. **Markov Chain Monte Carlo** IMS The purpose of these notes is to explore some simple relations between Markovian path and loop measures, the Poissonian ensembles of loops they determine, their occupation fields, uniform spanning trees, determinants, and Gaussian Markov fields such as the free field. These relations are first studied in complete generality for the finite discrete setting, then partly generalized to specific examples in infinite and continuous spaces. Markov Set-Chains Universitätsverlag Potsdam

Labelled Markov processes are probabilistic versions of labelled transition systems with continuous state spaces. The book covers basic probability and measure theory on continuous state spaces and then develops the theory of LMPs.

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