

NUMERICAL MATHEMATICS
AND SCIENTIFIC COMPUTATION

Numerical Methods for Structured Markov Chains

DARIO A. BINI,
GUY LATOUCHE, and
BEATRICE MEINI

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$$G = A_{-1} + A_0 G + A_1 G^2 + A_2 G^3 + \dots$$

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Numerical Methods For Structured Markov Chains

**Dario A. Bini, Guy Latouche, Beatrice
Meini**



Numerical Methods For Structured Markov Chains:

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book a list of the main annotations and algorithms used in the book and an extensive index Numerical Methods for Structured Markov Chains, 2008 Numerical Methods for Structured Markov Chains, 2008 **Markov Chains: Models, Algorithms and Applications** Wai-Ki Ching, Michael K. Ng, 2006-06-05 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 **Analyzing Markov Chains using Kronecker Products** Tugrul Dayar, 2012-07-25 Kronecker products are used to define the underlying Markov chain MC in various modeling formalisms including compositional Markovian models hierarchical Markovian models and stochastic process algebras The motivation behind using a Kronecker structured representation rather than a flat one is to alleviate the storage requirements associated with the MC With this approach systems that are an order of magnitude larger can be analyzed on the same platform The developments in the solution of such MCs are reviewed from an algebraic point of view and possible areas for further research are indicated with an emphasis on preprocessing using reordering grouping and lumping and numerical analysis using block iterative preconditioned projection multilevel decompositional and matrix analytic methods Case studies from closed queueing networks and stochastic chemical kinetics are provided to motivate decompositional and matrix analytic methods respectively *Markov Chains* Bruno Sericola, 2013-08-05 Markov Chains Theory and Applications Markov chains are a fundamental class of stochastic processes They are widely used to solve problems in a large number of domains such as operational research computer science communication networks and manufacturing systems The success of Markov chains is mainly due to their simplicity of use the large number of available theoretical results and the quality of algorithms developed for the numerical evaluation of many metrics of interest The author presents the theory of both discrete time and continuous time homogeneous Markov chains He carefully examines the explosion phenomenon the Kolmogorov equations the convergence to equilibrium and the passage time distributions to a state and to a subset of states These results are applied to birth and death processes He then proposes a detailed study of the uniformization technique by means of Banach algebra This technique is used for the transient analysis of several queueing systems **Algorithms for Quadratic Matrix and Vector Equations** Federico Poloni, 2012-03-13 This book is devoted to studying algorithms for the solution of a class of quadratic matrix and vector equations These equations appear in different forms in several practical applications especially

in applied probability and control theory The equations are first presented using a novel unifying approach then specific numerical methods are presented for the cases most relevant for applications and new algorithms and theoretical results developed by the author are presented The book focuses on matrix multiplication rich iterations such as cyclic reduction and the structured doubling algorithm SDA and contains a variety of new research results which as of today are only available in articles or preprints

Matrix Methods: Theory, Algorithms And Applications - Dedicated To The Memory Of Gene Golub Vadim Olshevsky, Eugene E Tyrtyshnikov, 2010-04-05 Compared to other books devoted to matrices this volume is unique in covering the whole of a triptych consisting of algebraic theory algorithmic problems and numerical applications all united by the essential use and urge for development of matrix methods This was the spirit of the 2nd International Conference on Matrix Methods and Operator Equations from 23-27 July 2007 in Moscow that was organized by Dario Bini Gene Golub Alexander Guterman Vadim Olshevsky Stefano Serra Capizzano Gilbert Strang and Eugene Tyrtyshnikov Matrix methods provide the key to many problems in pure and applied mathematics However linear algebra theory numerical algorithms and matrices in FEM BEM applications usually live as if in three separate worlds In this volume maybe for the first time ever they are compiled together as one entity as it was at the Moscow meeting where the algebraic part was impersonated by Hans Schneider algorithms by Gene Golub and applications by Guri Marchuk All topics intervened in plenary sessions are specially categorized into three sections of this volume The soul of the meeting was Gene Golub who rendered a charming Golub's dimension to the three main axes of the conference topics This volume is dedicated in gratitude to his memory

Applied Modeling Techniques and Data Analysis 1 Yiannis Dimotikalis, Alex Karagrigoriou, Christina Parpoula, Christos H. Skiadas, 2021-05-11 BIG DATA ARTIFICIAL INTELLIGENCE AND DATA ANALYSIS SET Coordinated by Jacques Janssen Data analysis is a scientific field that continues to grow enormously most notably over the last few decades following rapid growth within the tech industry as well as the wide applicability of computational techniques alongside new advances in analytic tools Modeling enables data analysts to identify relationships make predictions and to understand interpret and visualize the extracted information more strategically This book includes the most recent advances on this topic meeting increasing demand from wide circles of the scientific community Applied Modeling Techniques and Data Analysis 1 is a collective work by a number of leading scientists analysts engineers mathematicians and statisticians working on the front end of data analysis and modeling applications The chapters cover a cross section of current concerns and research interests in the above scientific areas The collected material is divided into appropriate sections to provide the reader with both theoretical and applied information on data analysis methods models and techniques along with appropriate applications

The Top Books of the Year Numerical Methods For Structured Markov Chains The year 2023 has witnessed a remarkable surge in literary brilliance, with numerous compelling novels captivating the hearts of readers worldwide. Lets delve into the realm of bestselling books, exploring the engaging narratives that have charmed audiences this year. Numerical Methods For Structured Markov Chains : Colleen Hoover's "It Ends with Us" This poignant tale of love, loss, and resilience has captivated readers with its raw and emotional exploration of domestic abuse. Hoover expertly weaves a story of hope and healing, reminding us that even in the darkest of times, the human spirit can succeed. Uncover the Best : Taylor Jenkins Reids "The Seven Husbands of Evelyn Hugo" This captivating historical fiction novel unravels the life of Evelyn Hugo, a Hollywood icon who defies expectations and societal norms to pursue her dreams. Reids absorbing storytelling and compelling characters transport readers to a bygone era, immersing them in a world of glamour, ambition, and self-discovery. Discover the Magic : Delia Owens "Where the Crawdads Sing" This mesmerizing coming-of-age story follows Kya Clark, a young woman who grows up alone in the marshes of North Carolina. Owens crafts a tale of resilience, survival, and the transformative power of nature, captivating readers with its evocative prose and mesmerizing setting. These popular novels represent just a fraction of the literary treasures that have emerged in 2023. Whether you seek tales of romance, adventure, or personal growth, the world of literature offers an abundance of compelling stories waiting to be discovered. The novel begins with Richard Pape, a bright but troubled young man, arriving at Hampden College. Richard is immediately drawn to the group of students who call themselves the Classics Club. The club is led by Henry Winter, a brilliant and charismatic young man. Henry is obsessed with Greek mythology and philosophy, and he quickly draws Richard into his world. The other members of the Classics Club are equally as fascinating. Bunny Corcoran is a wealthy and spoiled young man who is always looking for a good time. Charles Tavis is a quiet and reserved young man who is deeply in love with Henry. Camilla Macaulay is a beautiful and intelligent young woman who is drawn to the power and danger of the Classics Club. The students are all deeply in love with Morrow, and they are willing to do anything to please him. Morrow is a complex and mysterious figure, and he seems to be manipulating the students for his own purposes. As the students become more involved with Morrow, they begin to commit increasingly dangerous acts. The Secret History is a brilliant and suspenseful novel that will keep you guessing until the very end. The novel is a warning tale about the dangers of obsession and the power of evil.

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