
Matrix Analysis And Applied Linear Algebra

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Applied Linear Algebra

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Matrix Analysis and Applied Linear Algebra *SIAM*

Matrix Analysis and Applied Linear Algebra is an honest math text that circumvents the traditional definition-theorem-proof format that has bored students in the past. Meyer uses a fresh

approach to introduce a variety of problems and examples ranging from the elementary to the challenging and from simple applications to discovery problems. The focus on applications is a big difference between this book and others. Meyer's book is more rigorous and goes into more depth than some. He includes some of the more contemporary topics of applied linear algebra which are not normally found in undergraduate textbooks. Modern concepts and notation are used to introduce the various aspects of linear equations, leading readers easily to numerical computations and applications. The theoretical developments are always accompanied with examples, which are worked out in detail. Each section ends with a large number of carefully chosen exercises from which the students can gain further insight.

Applied Linear Algebra and Matrix Analysis *Springer Science & Business Media*

This new book offers a fresh approach to matrix and linear algebra by providing a balanced blend of applications, theory, and computation, while highlighting their interdependence. Intended for a one-semester course, Applied Linear Algebra and Matrix Analysis places special emphasis on linear algebra as an experimental science, with numerous examples, computer exercises, and projects. While the flavor is heavily computational and experimental, the text is independent of specific hardware or software platforms. Throughout the book, significant motivating examples are woven into the text, and each section ends with a set of exercises.

Matrix Analysis and Applied Linear Algebra

Band. ...

Matrix Analysis for Scientists and Engineers *SIAM*

"Prerequisites for using this text are knowledge of calculus and some previous exposure to matrices and linear algebra, including, for example, a basic knowledge of determinants, singularity of matrices, eigenvalues and eigenvectors, and positive definite matrices. There are exercises at the end of each chapter."--BOOK JACKET.

Introduction to Applied Linear Algebra

Vectors, Matrices, and Least Squares *Cambridge University Press*

A groundbreaking introduction to vectors, matrices, and least squares for engineering applications, offering a wealth of practical examples.

Numerical Matrix Analysis

Linear Systems and Least Squares *SIAM*

Matrix analysis presented in the context of numerical computation at a basic level.

An Introduction to Applied Matrix Analysis *World Scientific Publishing Company*

It is well known that most problems in science and engineering eventually progress into matrix problems. This book gives an elementary introduction to applied matrix theory and it also includes some new results obtained in recent years. The book consists of eight chapters. It includes perturbation and error analysis; the conjugate gradient method for solving linear systems; preconditioning techniques; and least

squares algorithms based on orthogonal transformations, etc. The last two chapters include some latest development in the area. In Chap. 7, we construct optimal preconditioners for functions of matrices. More precisely, let f be a function of matrices. Given a matrix A , there are two choices of constructing optimal preconditioners for $f(A)$. Properties of these preconditioners are studied for different functions. In Chap. 8, we study the Bottcher-Wenzel conjecture and discuss related problems. This is a textbook for senior undergraduate or junior graduate students majoring in science and engineering. The material is accessible to students who, in various disciplines, have basic linear algebra, calculus, numerical analysis, and computing knowledge. The book is also useful to researchers in computational science who are interested in applied matrix theory.

Matrix Analysis *Cambridge University Press*

Linear algebra and matrix theory are fundamental tools in mathematical and physical science, as well as fertile fields for research. This second edition of this acclaimed text presents results of both classic and recent matrix analysis using canonical forms as a unifying theme and demonstrates their importance in a variety of applications. This thoroughly revised and updated second edition is a text for a second course on linear algebra and has more than 1,100 problems and exercises, new sections on the singular value and CS decompositions and the Weyr canonical form, expanded treatments of inverse problems and of block matrices, and much more.

Matrix Analysis *Cambridge University Press*

Matrix Analysis presents the classical and recent results for matrix analysis that have proved to be important to applied mathematics.

Linear Algebra and Matrix Analysis for Statistics *CRC Press*

Linear Algebra and Matrix Analysis for Statistics offers a gradual exposition to linear algebra without sacrificing the rigor of the subject. It presents both the vector space approach and the canonical forms in matrix theory. The book is as self-contained as possible, assuming no prior knowledge of linear algebra. The authors first address the rudimentary mechanics of linear systems using Gaussian elimination and the resulting decompositions. They introduce Euclidean vector spaces using less abstract concepts and make connections to systems of linear equations wherever possible. After illustrating the importance of the rank of a matrix, they discuss complementary subspaces, oblique projectors, orthogonality, orthogonal projections and projectors, and orthogonal reduction. The text then shows how the theoretical concepts developed are handy in analyzing solutions for linear systems. The authors also explain how determinants are useful for characterizing and deriving properties concerning matrices and linear systems. They then cover eigenvalues, eigenvectors, singular value decomposition, Jordan decomposition (including a proof), quadratic forms, and Kronecker and Hadamard products. The book concludes with accessible treatments of advanced topics, such as linear iterative systems, convergence of matrices, more general vector spaces, linear transformations,

and Hilbert spaces.

Applied Linear Algebra *Springer*

This textbook develops the essential tools of linear algebra, with the goal of imparting technique alongside contextual understanding. Applications go hand-in-hand with theory, each reinforcing and explaining the other. This approach encourages students to develop not only the technical proficiency needed to go on to further study, but an appreciation for when, why, and how the tools of linear algebra can be used across modern applied mathematics. Providing an extensive treatment of essential topics such as Gaussian elimination, inner products and norms, and eigenvalues and singular values, this text can be used for an in-depth first course, or an application-driven second course in linear algebra. In this second edition, applications have been updated and expanded to include numerical methods, dynamical systems, data analysis, and signal processing, while the pedagogical flow of the core material has been improved. Throughout, the text emphasizes the conceptual connections between each application and the underlying linear algebraic techniques, thereby enabling students not only to learn how to apply the mathematical tools in routine contexts, but also to understand what is required to adapt to unusual or emerging problems. No previous knowledge of linear algebra is needed to approach this text, with single-variable calculus as the only formal prerequisite. However, the reader will need to draw upon some mathematical maturity to engage in the increasing abstraction inherent to the subject. Once equipped with the main tools and concepts from this book, students will be prepared for

further study in differential equations, numerical analysis, data science and statistics, and a broad range of applications. The first author's text, *Introduction to Partial Differential Equations*, is an ideal companion volume, forming a natural extension of the linear mathematical methods developed here.

Topics in Matrix Analysis *Cambridge University Press*

Building on the foundations of its predecessor volume, *Matrix Analysis*, this book treats in detail several topics in matrix theory not included in the previous volume, but with important applications and of special mathematical interest. As with the previous volume, the authors assume a background knowledge of elementary linear algebra and rudimentary analytical concepts. Many examples and exercises of varying difficulty are included.

Matrix Analysis and Applied Linear Algebra

This book avoids the traditional definition-theorem-proof format; instead a fresh approach introduces a variety of problems and examples all in a clear and informal style. The in-depth focus on applications separates this book from others, and helps students to see how linear algebra can be applied to real-life situations. Some of the more contemporary topics of applied linear algebra are included here which are not normally found in undergraduate textbooks. Theoretical developments are always accompanied with detailed examples, and each section ends with a number of exercises from which students can gain further insight. Moreover, the inclusion of historical information provides personal insights

into the mathematicians who developed this subject. The textbook contains numerous examples and exercises, historical notes, and comments on numerical performance and the possible pitfalls of algorithms. Solutions to all of the exercises are provided, as well as a CD-ROM containing a searchable copy of the textbook.

Applied and Computational Matrix Analysis

MAT-TRIAD, Coimbra, Portugal, September 2015 Selected, Revised Contributions *Springer*

This volume presents recent advances in the field of matrix analysis based on contributions at the MAT-TRIAD 2015 conference. Topics covered include interval linear algebra and computational complexity, Birkhoff polynomial basis, tensors, graphs, linear pencils, K-theory and statistic inference, showing the ubiquity of matrices in different mathematical areas. With a particular focus on matrix and operator theory, statistical models and computation, the International Conference on Matrix Analysis and its Applications 2015, held in Coimbra, Portugal, was the sixth in a series of conferences. Applied and Computational Matrix Analysis will appeal to graduate students and researchers in theoretical and applied mathematics, physics and engineering who are seeking an overview of recent problems and methods in matrix analysis.

Matrix Analysis and Applications *Cambridge University Press*

The theory, methods and applications of matrix analysis are presented here in a novel theoretical framework.

Matrix Algorithms Volume 2

Eigensystems *SIAM*

This is the second volume in a projected five-volume survey of numerical linear algebra and matrix algorithms. It treats the numerical solution of dense and large-scale eigenvalue problems with an emphasis on algorithms and the theoretical background required to understand them. The notes and reference sections contain pointers to other methods along with historical comments. The book is divided into two parts: dense eigenproblems and large eigenproblems. The first part gives a full treatment of the widely used QR algorithm, which is then applied to the solution of generalized eigenproblems and the computation of the singular value decomposition. The second part treats Krylov sequence methods such as the Lanczos and Arnoldi algorithms and presents a new treatment of the Jacobi-Davidson method. These volumes are not intended to be encyclopedic, but provide the reader with the theoretical and practical background to read the research literature and implement or modify new algorithms.

Fundamentals of Matrix Analysis with Applications *John Wiley & Sons*

An accessible and clear introduction to linear algebra with a focus on matrices and engineering applications. Providing comprehensive coverage of matrix theory from a geometric and physical perspective, Fundamentals of Matrix Analysis with Applications describes the functionality of matrices and their ability to quantify and analyze many practical applications. Written by a highly qualified author team, the book presents tools for matrix analysis and is illustrated with extensive examples and software

implementations. Beginning with a detailed exposition and review of the Gauss elimination method, the authors maintain readers' interest with refreshing discussions regarding the issues of operation counts, computer speed and precision, complex arithmetic formulations, parameterization of solutions, and the logical traps that dictate strict adherence to Gauss's instructions. The book heralds matrix formulation both as notational shorthand and as a quantifier of physical operations such as rotations, projections, reflections, and the Gauss reductions. Inverses and eigenvectors are visualized first in an operator context before being addressed computationally. Least squares theory is expounded in all its manifestations including optimization, orthogonality, computational accuracy, and even function theory. Fundamentals of Matrix Analysis with Applications also features: Novel approaches employed to explicate the QR, singular value, Schur, and Jordan decompositions and their applications Coverage of the role of the matrix exponential in the solution of linear systems of differential equations with constant coefficients Chapter-by-chapter summaries, review problems, technical writing exercises, select solutions, and group projects to aid comprehension of the presented concepts Fundamentals of Matrix Analysis with Applications is an excellent textbook for undergraduate courses in linear algebra and matrix theory for students majoring in mathematics, engineering, and science. The book is also an accessible go-to reference for readers seeking clarification of the fine points of kinematics, circuit theory, control theory, computational statistics, and numerical algorithms.

Matrix Analysis and Computations *SIAM*

This comprehensive book is presented in two parts; the first part introduces the basics of matrix analysis necessary for matrix computations, and the second part presents representative methods and the corresponding theories in matrix computations. Among the key features of the book are the extensive exercises at the end of each chapter. Matrix Analysis and Computations provides readers with the matrix theory necessary for matrix computations, especially for direct and iterative methods for solving systems of linear equations. It includes systematic methods and rigorous theory on matrix splitting iteration methods and Krylov subspace iteration methods, as well as current results on preconditioning and iterative methods for solving standard and generalized saddle-point linear systems. This book can be used as a textbook for graduate students as well as a self-study tool and reference for researchers and engineers interested in matrix analysis and matrix computations. It is appropriate for courses in numerical analysis, numerical optimization, data science, and approximation theory, among other topics

Problems In Linear Algebra And Matrix Theory *World Scientific*

This is the revised and expanded edition of the problem book Linear Algebra: Challenging Problems for Students, now entitled Problems in Linear Algebra and Matrix Theory. This new edition contains about fifty-five examples and many new problems, based on the author's lecture notes of Advanced Linear Algebra classes at Nova Southeastern University (NSU-Florida) and short lectures Matrix Gems at Shanghai University and Beijing

Normal University. The book is intended for upper division undergraduate and beginning graduate students, and it can be used as text or supplement for a second course in linear algebra. Each chapter starts with Definitions, Facts, and Examples, followed by problems. Hints and solutions to all problems are also provided.

Applied Linear Algebra and Matrix Analysis *Springer*

This new book offers a fresh approach to matrix and linear algebra by providing a balanced blend of applications, theory, and computation, while highlighting their interdependence. Intended for a one-semester course, Applied Linear Algebra and Matrix Analysis places special emphasis on linear algebra as an experimental science, with numerous examples, computer exercises, and projects. While the flavor is heavily computational and experimental, the text is independent of specific hardware or software platforms. Throughout the book, significant motivating examples are woven into the text, and each section ends with a set of exercises.

Linear Algebra and Matrix Theory *Courier Corporation*

One of the best available works on matrix theory in the context of modern algebra, this text bridges the gap between ordinary undergraduate studies and completely abstract mathematics. 1952 edition.

PETSc for Partial Differential Equations: Numerical Solutions in C and Python *SIAM*

The Portable, Extensible Toolkit for Scientific Computation (PETSc) is an open-source library of advanced data structures and methods for solving linear

and nonlinear equations and for managing discretizations. This book uses these modern numerical tools to demonstrate how to solve nonlinear partial differential equations (PDEs) in parallel. It starts from key mathematical concepts, such as Krylov space methods, preconditioning, multigrid, and Newton's method. In PETSc these components are composed at run time into fast solvers. Discretizations are introduced from the beginning, with an emphasis on finite difference and finite element methodologies. The example C programs of the first 12 chapters, listed on the inside front cover, solve (mostly) elliptic and parabolic PDE problems. Discretization leads to large, sparse, and generally nonlinear systems of algebraic equations. For such problems, mathematical solver concepts are explained and illustrated through the examples, with sufficient context to speed further development. PETSc for Partial Differential Equations addresses both discretizations and fast solvers for PDEs, emphasizing practice more than theory. Well-structured examples lead to run-time choices that result in high solver performance and parallel scalability. The last two chapters build on the reader's understanding of fast solver concepts when applying the Firedrake Python finite element solver library. This textbook, the first to cover PETSc programming for nonlinear PDEs, provides an on-ramp for graduate students and researchers to a major area of high-performance computing for science and engineering. It is suitable as a supplement for courses in scientific computing or numerical methods for differential equations.

Matrix Analysis of Structures *Cengage Learning*

This book takes a fresh, student-oriented approach to teaching the material covered in the senior- and first-year graduate-level matrix structural analysis course. Unlike traditional texts for this course that are difficult to read, Kassimali takes special care to provide understandable and exceptionally clear explanations of concepts, step-by-step procedures for analysis, flowcharts, and interesting and modern examples, producing a technically and mathematically accurate presentation of the subject. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version.

Applied Numerical Linear Algebra
SIAM

This comprehensive textbook is designed for first-year graduate students from a variety of engineering and scientific disciplines.

A Unified Introduction to Linear Algebra

Models, Methods, and Theory
Macmillan Publishing Company

Approximation Theory and Approximation Practice, Extended Edition *SIAM*

This is a textbook on classical polynomial and rational approximation theory for the twenty-first century. Aimed at advanced undergraduates and graduate students across all of applied mathematics, it uses MATLAB to teach the field's most important ideas and results. Approximation Theory and Approximation Practice, Extended Edition differs fundamentally from other works on approximation theory in a number of ways: its emphasis is on

topics close to numerical algorithms; concepts are illustrated with Chebfun; and each chapter is a PUBLISHable MATLAB M-file, available online. The book centers on theorems and methods for analytic functions, which appear so often in applications, rather than on functions at the edge of discontinuity with their seductive theoretical challenges. Original sources are cited rather than textbooks, and each item in the bibliography is accompanied by an editorial comment. In addition, each chapter has a collection of exercises, which span a wide range from mathematical theory to Chebfun-based numerical experimentation. This textbook is appropriate for advanced undergraduate or graduate students who have an understanding of numerical analysis and complex analysis. It is also appropriate for seasoned mathematicians who use MATLAB.

Matrix Positivity *Cambridge University Press*

This comprehensive reference, for mathematical, engineering and social scientists, covers matrix positivity classes and their applications.

Linear Models and the Relevant Distributions and Matrix Algebra
CRC Press

Linear Models and the Relevant Distributions and Matrix Algebra provides in-depth and detailed coverage of the use of linear statistical models as a basis for parametric and predictive inference. It can be a valuable reference, a primary or secondary text in a graduate-level course on linear models, or a resource used (in a course on mathematical statistics) to illustrate various theoretical concepts in the context of a relatively complex setting of

great practical importance. Features: Provides coverage of matrix algebra that is extensive and relatively self-contained and does so in a meaningful context Provides thorough coverage of the relevant statistical distributions, including spherically and elliptically symmetric distributions Includes extensive coverage of multiple-comparison procedures (and of simultaneous confidence intervals), including procedures for controlling the k-FWER and the FDR Provides thorough coverage (complete with detailed and highly accessible proofs) of results on the properties of various linear-model procedures, including those of least squares estimators and those of the F test. Features the use of real data sets for illustrative purposes Includes many exercises David Harville served for 10 years as a mathematical statistician in the Applied Mathematics Research Laboratory of the Aerospace Research Laboratories at Wright-Patterson AFB, Ohio, 20 years as a full professor in Iowa State University's Department of Statistics where he now has emeritus status, and seven years as a research staff member of the Mathematical Sciences Department of IBM's T.J. Watson Research Center. He has considerable relevant experience, having taught M.S. and Ph.D. level courses in linear models, been the thesis advisor of 10 Ph.D. graduates, and authored or co-authored two books and more than 80 research articles. His work has been recognized through his election as a Fellow of the American Statistical Association and of the Institute of Mathematical Statistics and as a member of the International Statistical Institute.

Linear Algebra Done Right Springer

Science & Business Media

This text for a second course in linear algebra, aimed at math majors and graduates, adopts a novel approach by banishing determinants to the end of the book and focusing on understanding the structure of linear operators on vector spaces. The author has taken unusual care to motivate concepts and to simplify proofs. For example, the book presents - without having defined determinants - a clean proof that every linear operator on a finite-dimensional complex vector space has an eigenvalue. The book starts by discussing vector spaces, linear independence, span, basics, and dimension. Students are introduced to inner-product spaces in the first half of the book and shortly thereafter to the finite-dimensional spectral theorem. A variety of interesting exercises in each chapter helps students understand and manipulate the objects of linear algebra. This second edition features new chapters on diagonal matrices, on linear functionals and adjoints, and on the spectral theorem; some sections, such as those on self-adjoint and normal operators, have been entirely rewritten; and hundreds of minor improvements have been made throughout the text.

Introduction to Matrix Analysis and Applications Springer Science & Business Media

Matrices can be studied in different ways. They are a linear algebraic structure and have a topological/analytical aspect (for example, the normed space of matrices) and they also carry an order structure that is induced by positive semidefinite matrices. The interplay of these closely related structures is an essential feature of matrix analysis. This book explains

these aspects of matrix analysis from a functional analysis point of view. After an introduction to matrices and functional analysis, it covers more advanced topics such as matrix monotone functions, matrix means, majorization and entropies. Several applications to quantum information are also included. Introduction to Matrix Analysis and Applications is appropriate for an advanced graduate course on matrix analysis, particularly aimed at studying quantum information. It can also be used as a reference for researchers in quantum information, statistics, engineering and economics.

Advanced Linear Algebra *Springer Science & Business Media*

This book covers an especially broad range of topics, including some topics not generally found in linear algebra books. The first part details the basics of linear algebra. Coverage then proceeds to a discussion of modules, emphasizing a comparison with vector spaces. A thorough discussion of inner product spaces, eigenvalues, eigenvectors, and finite dimensional spectral theory follows, culminating in the finite dimensional spectral theorem for normal operators.

Solving Transcendental Equations

The Chebyshev Polynomial Proxy and Other Numerical Rootfinders, Perturbation Series, and Oracles *SIAM*

Transcendental equations arise in every branch of science and engineering. While most of these equations are easy to solve, some are not, and that is where this book serves as the mathematical equivalent of a skydiver's reserve parachute--not always needed, but

indispensable when it is. The author's goal is to teach the art of finding the root of a single algebraic equation or a pair of such equations.

Linear Algebra and Matrix Computations with MATLAB® *Walter de Gruyter GmbH & Co KG*

This book focuses the solutions of linear algebra and matrix analysis problems, with the exclusive use of MATLAB. The topics include representations, fundamental analysis, transformations of matrices, matrix equation solutions as well as matrix functions. Attempts on matrix and linear algebra applications are also explored.

Matrix Methods

Applied Linear Algebra *Academic Press*

Matrix Methods: Applied Linear Algebra, Third Edition, as a textbook, provides a unique and comprehensive balance between the theory and computation of matrices. The application of matrices is not just for mathematicians. The use by other disciplines has grown dramatically over the years in response to the rapid changes in technology. Matrix methods is the essence of linear algebra and is what is used to help physical scientists; chemists, physicists, engineers, statisticians, and economists solve real world problems. Applications like Markov chains, graph theory and Leontief Models are placed in early chapters. Readability- The prerequisite for most of the material is a firm understanding of algebra. New chapters on Linear Programming and Markov Chains Appendix referencing the use of technology, with special emphasis on computer algebra systems (CAS) MATLAB

Linear Algebra Springer

This self-contained textbook takes a matrix-oriented approach to linear algebra and presents a complete theory, including all details and proofs, culminating in the Jordan canonical form and its proof. Throughout the development, the applicability of the results is highlighted. Additionally, the book presents special topics from applied linear algebra including matrix functions, the singular value decomposition, the Kronecker product and linear matrix equations. The matrix-oriented approach to linear algebra leads to a better intuition and a deeper understanding of the abstract concepts, and therefore simplifies their use in real world applications. Some of these applications are presented in detailed examples. In several 'MATLAB-Minutes' students can comprehend the concepts and results using computational experiments. Necessary basics for the use of MATLAB are presented in a short introduction. Students can also actively work with the material and practice their mathematical skills in more than 300 exercises.

Matrix Algebra for Linear Models

John Wiley & Sons

A self-contained introduction to matrix analysis theory and applications in the field of statistics. Comprehensive in scope, Matrix Algebra for Linear Models offers a succinct summary of matrix theory and its related applications to statistics, especially linear models. The book provides a unified presentation of the mathematical properties and statistical applications of matrices in order to define and manipulate data. Written for theoretical and applied statisticians, the book utilizes multiple numerical examples to illustrate key

ideas, methods, and techniques crucial to understanding matrix algebra's application in linear models. Matrix Algebra for Linear Models expertly balances concepts and methods allowing for a side-by-side presentation of matrix theory and its linear model applications. Including concise summaries on each topic, the book also features: Methods of deriving results from the properties of eigenvalues and the singular value decomposition. Solutions to matrix optimization problems for obtaining more efficient biased estimators for parameters in linear regression models. A section on the generalized singular value decomposition. Multiple chapter exercises with selected answers to enhance understanding of the presented material. Matrix Algebra for Linear Models is an ideal textbook for advanced undergraduate and graduate-level courses on statistics, matrices, and linear algebra. The book is also an excellent reference for statisticians, engineers, economists, and readers interested in the linear statistical model.

Matrix Methods

Applied Linear Algebra and Sabermetrics Academic Press

Matrix Methods: Applied Linear Algebra and Sabermetrics, Fourth Edition, provides a unique and comprehensive balance between the theory and computation of matrices. Rapid changes in technology have made this valuable overview on the application of matrices relevant not just to mathematicians, but to a broad range of other fields. Matrix methods, the essence of linear algebra, can be used to help physical scientists--chemists, physicists, engineers,

statisticians, and economists-- solve real world problems. Provides early coverage of applications like Markov chains, graph theory and Leontief Models Contains accessible content that requires only a firm understanding of algebra Includes dedicated chapters on Linear Programming and Markov Chains

Multidimensional Analysis

Algebras and Systems for Science and Engineering *Springer Science & Business Media*

This book deals with the mathematical properties of dimensioned quantities, such as length, mass, voltage, and viscosity. Beginning with a careful examination of how one expresses the numerical results of a measurement and uses these results in subsequent manipulations, the author rigorously constructs the notion of dimensioned numbers and discusses their algebraic structure. The result is a unification of linear algebra and traditional dimensional analysis that can be extended from the scalars to which the traditional analysis is perforce restricted to multidimensional vectors of the sort frequently encountered in engineering, systems theory, economics, and other applications.

Matrix Theory and Applications *American Mathematical Soc.*

This volume contains the lecture notes prepared for the AMS Short Course on Matrix Theory and Applications, held in Phoenix in January, 1989. Matrix theory

continues to enjoy a renaissance that has accelerated in the past decade, in part because of stimulation from a variety of applications and considerable interplay with other parts of mathematics. In addition, the great increase in the number and vitality of specialists in the field has dispelled the popular misconception that the subject has been fully researched.

Functions of Matrices

Theory and Computation *SIAM*

A thorough and elegant treatment of the theory of matrix functions and numerical methods for computing them, including an overview of applications, new and unpublished research results, and improved algorithms. Key features include a detailed treatment of the matrix sign function and matrix roots; a development of the theory of conditioning and properties of the Fréchet derivative; Schur decomposition; block Parlett recurrence; a thorough analysis of the accuracy, stability, and computational cost of numerical methods; general results on convergence and stability of matrix iterations; and a chapter devoted to the $f(A)b$ problem. Ideal for advanced courses and for self-study, its broad content, references and appendix also make this book a convenient general reference. Contains an extensive collection of problems with solutions and MATLAB implementations of key algorithms.