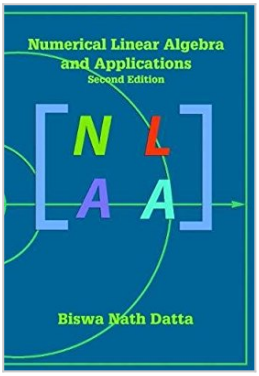

Numerical Linear Algebra and Applications, Second Edition

By Biswa Nath Datta

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This second edition of the author s acclaimed textbook covers the major topics of computational linear algebra, including solution of a system of linear equations, least-squares solutions of linear systems, computation of eigenvalues, eigenvectors, and singular value problems.

Important features of the original edition have been updated and improved. Drawing from numerous disciplines of science and engineering, the author covers a variety of motivating applications. When a physical problem is posed, the scientific and engineering significance of the solution is clearly stated. Each chapter contains a summary of the important concepts developed in that chapter, suggestions for further reading, and numerous exercises, both theoretical and MATLAB® and MATCOM based. The author also provides a list of key words for quick reference.

The MATLAB toolkit MATCOM contains implementations of the major algorithms associated with the book and enables students to study different algorithms for the same problem, comparing efficiency, stability, and accuracy. Additional online content includes appendices containing MATLAB codes and the MATCOM toolkit solutions to selected problems as well as an extra chapter on special topics.

The topics of generalized and quadratic eigenvalue problems, which arise in practical engineering applications, are described in great detail. This feature, along with an important overview of Krylov subspace methods and an extensively updated bibliography, enhances the book s value as a reference for both engineers and students.

Audience: This book is intended for undergraduate and graduate students in applied and computational mathematics, scientific computing, computer science, financial mathematics, actuarial sciences, and electrical and mechanical engineering. It will also appeal to researchers in mathematics, computer science, physics, chemistry, biology, economics, statistics, and aerospace, electrical, mechanical, and chemical engineering as well as practicing engineers and

industrial mathematicians.

Contents: Preface; Chapter 1: Linear Algebra Problems, Their Importance, and Computational Difficulties; Chapter 2: A Review of Some Required Concepts from Core Linear Algebra; Chapter 3: Floating Point Numbers and Errors in Computations; Chapter 4: Stability of Algorithms and Conditioning of Problems; Chapter 5: Gaussian Elimination and LU Factorization; Chapter 6: Numerical Solutions of Linear Systems; Chapter 7: QR Factorization, Singular Value Decomposition, and Projections; Chapter 8: Least-Squares Solutions to Linear Systems; Chapter 9: Numerical Matrix Eigenvalue Problems; Chapter 10: Numerical Symmetric Eigenvalue Problem and Singular Value Decomposition; Chapter 11: Generalized and Quadratic Eigenvalue Problems; Chapter 12: Iterative Methods for Large and Sparse Problems: An Overview; Chapter 13: Key Terms in Numerical Linear Algebra; Bibliography; Index

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Editorial Review

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Biswa Nath Datta is Professor of Mathematical Sciences, Adjunct Professor of Electrical and Mechanical Engineering, and Distinguished Research Professor at Northern Illinois University. He has authored more than 115 interdisciplinary research papers, the books Numerical Methods for Linear Control Systems Design and Analysis and Numerical Linear Algebra and Applications, and several associated software packages. He was elected a Fellow of IEEE in 2000, inducted an Academician of the Academy of Nonlinear Sciences in 2002, and named a recipient of a Senior Fulbright Specialist award, an IEEE Distinguished Lecturer award, and several IEEE Plaques of Honor.

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