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Diagonalization Powers of Matrices; Applications; Electric Circuit; Irreducible Matrices; Ranking of Teams Using Eigenvectors; Computing Eigenvalues and Eigenvectors using MATLAB; Chapter Summary; Problems; MATLAB Problems; Orthogonal Vectors and Matrices; Introduction; The Inner Product; Orthogonal Matrices; Symmetric Matrices and Orthogonality; The L2 Inner Product; The Cauchy-Schwarz Inequality; Signal Comparison; Chapter Summary; Problems; MATLAB Problems; Vector and Matrix Norms; Vector Norms; Properties of the 2-Norm; Spherical Coordinates; Matrix Norms; The Frobenius Matrix Norm

Induced Matrix Norms Submultiplicative Matrix Norms; Computing the Matrix 2-Norm; Properties of the Matrix 2-Norm; Chapter Summary; Problems; MATLAB Problems; Floating Point Arithmetic; Integer Representation; Floating-Point Representation; Mapping from Real Numbers to Floating-Point Numbers; Floating-Point Arithmetic; Relative Error; Rounding Error Bounds; Addition; Multiplication; Matrix Operations; Minimizing Errors; Avoid Adding a Huge Number to a Small Number; Avoid Subtracting Numbers That Are Close; Chapter Summary; Problems; MATLAB Problems; Algorithms; Pseudocode Examples Inner Product of Two Vectors Computing the Frobenius Norm; Matrix Multiplication; Block Matrices; Algorithm Efficiency; Smaller Flop Count Is Not Always Better; Measuring Truncation Error; The Solution to Upper and Lower Triangular Systems; Efficiency Analysis; The Thomas Algorithm; Efficiency Analysis; Chapter Summary; Problems; MATLAB Problems; Conditioning of Problems and Stability of Algorithms; Why Do We Need Numerical Linear Algebra?; Computation Error; Forward Error; Backward Error; Algorithm Stability; Examples of Unstable Algorithms; Conditioning of a Problem Perturbation Analysis for Solving a Linear System

Sommario/riassunto

Designed for those who want to gain a practical knowledge of modern computational techniques for the numerical solution of linear algebra problems, Numerical Linear Algebra with Applications contains all the material necessary for a first year graduate or advanced undergraduate course on numerical linear algebra with numerous applications to engineering and science. With a unified presentation of computation, basic algorithm analysis, and numerical methods to compute solutions, this book is ideal for solving real-world problems. It provides necessary mathematical background information for
