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Autore	Golub Gene H (Gene Howard), <1932-2007.>
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Nota di contenuto	Frontmatter -- Contents -- Preface -- PART 1. Theory -- Chapter 1. Introduction -- Chapter 2. Orthogonal Polynomials -- Chapter 3. Properties of Tridiagonal Matrices -- Chapter 4. The Lanczos and Conjugate Gradient Algorithms -- Chapter 5. Computation of the Jacobi Matrices -- Chapter 6. Gauss Quadrature -- Chapter 7. Bounds for Bilinear Forms uT*f*(A)v -- Chapter 8. Extensions to Nonsymmetric Matrices -- Chapter 9. Solving Secular Equations -- PART 2. Applications -- Chapter 10. Examples of Gauss Quadrature Rules -- Chapter 11. Bounds and Estimates for Elements of Functions of Matrices -- Chapter 12. Estimates of Norms of Errors in the Conjugate Gradient Algorithm -- Chapter 13. Least Squares Problems -- Chapter 14. Total Least Squares -- Chapter 15. Discrete Ill-Posed Problems -- Bibliography -- Index
Sommario/riassunto	This computationally oriented book describes and explains the mathematical relationships among matrices, moments, orthogonal polynomials, quadrature rules, and the Lanczos and conjugate gradient algorithms. The book bridges different mathematical areas to obtain algorithms to estimate bilinear forms involving two vectors and a function of the matrix. The first part of the book provides the necessary

mathematical background and explains the theory. The second part describes the applications and gives numerical examples of the algorithms and techniques developed in the first part. Applications addressed in the book include computing elements of functions of matrices; obtaining estimates of the error norm in iterative methods for solving linear systems and computing parameters in least squares and total least squares; and solving ill-posed problems using Tikhonov regularization. This book will interest researchers in numerical linear algebra and matrix computations, as well as scientists and engineers working on problems involving computation of bilinear forms.