

Golub, Gene H.; Van Loan, Charles F.

Matrix computations. (English) Zbl 0559.65011

Oxford: North Oxford Academic; Baltimore, Maryland: The Johns Hopkins University Press. XVI, 476 p. (1983).

This is a textbook where two of the currently most active researchers in numerical linear algebra expound their subject. The primary intent is to bring the thinking of current research down to the classroom, and to choose those notions that the authors deem fruitful. As an example vector and matrix norms are used from the start, and a novel proof allows introduction of the singular value decomposition without assuming knowledge about eigenvalues. Though the authors state that their choice of subjects is personal, the book gives a rather complete coverage; the only subarea of importance at this level that has been omitted, is direct methods for sparse linear systems. Chapter headings: 1. Background matrix algebra. 2. Measuring vectors, matrices, subspaces, and linear system sensitivity. 3. Numerical matrix algebra. 4. Gaussian elimination. 5. Special linear systems. 6. Orthogonalization and least squares methods. 7. The unsymmetric eigenvalue problem. 8. The symmetric eigenvalue problem. 9. Lanczos methods. 10. Iterative methods for linear systems. 11. Functions of matrices. 12. Special topics.

Reviewer: [A.Ruhe](#)

MSC:

[65Fxx](#) Numerical linear algebra

[65-01](#) Introductory exposition (textbooks, tutorial papers, etc.) pertaining to numerical analysis

[15A18](#) Eigenvalues, singular values, and eigenvectors

[15A60](#) Norms of matrices, numerical range, applications of functional analysis to matrix theory

Cited in **14** Reviews
Cited in **934** Documents

Keywords:

[matrix computations](#); [textbook](#); [matrix algebra](#); [Gaussian elimination](#); [Orthogonalization](#); [least squares methods](#); [eigenvalue problem](#); [Lanczos methods](#); [Iterative methods](#); [Functions of matrices](#)