

Gentle, James E.

Matrix algebra. Theory, computations, and applications in statistics. (English) Zbl 1133.15001
Springer Texts in Statistics. New York, NY: Springer (ISBN 978-0-387-70872-0/hbk). xxii, 528 p. (2007).

This is a very refreshing book covering matrix theory and its applications in statistics and numerical analysis. It has the character of a handbook and is lucidly written. The first 250 pages give a narrative account of much of our current knowledge of theoretical linear algebra from a practical viewpoint. Proofs are rare and far in-between. Instead, the essence and fibers of linear algebra are laid out and as laid out they lend themselves to self study and insight.

The 7 first chapters review vectors and matrices, vector spaces and matrix operations including many applications to numerical computations and statistics. They also outline specialties such as vector and matrix function derivatives, matrix optimization problems, details of matrix computations and more. This rich introduction to linear algebra is followed by 120 pages of applications to statistics with 2 chapters on special matrices, Perron-Frobenius, graphs and graphical means, as well as to modeling, data analysis, and applied and computational statistics.

The concluding 100 pages deal with specifics of numerical linear algebra, computer arithmetic and architecture, and readily available software. A 14 page bibliography that is sufficient to trace the omitted proof details rounds out this book into almost a handbook of current state of the art knowledge in matrix theory and applications. There are eleven sets of exercises and detailed hints and partial solutions also.

Reviewer: [Frank Uhlig \(Auburn\)](#)

MSC:

- 15-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to linear algebra
- 62-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to statistics
- 65Fxx Numerical linear algebra

Cited in **2** Reviews
Cited in **26** Documents

Keywords:

[matrix theory](#); [linear algebra](#); [numerical linear algebra](#); [statistics](#); [textbook](#)

Software:

[Algorithm 693](#); [EISPACK](#); [GSL](#); [INTERVAL_ARITHMETIC](#); [LAPACK](#); [Matlab](#); [mctoolbox](#); [MPI](#); [RRQR](#); [toms/782](#)

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