



# Matrix Analysis for Statistics

By James R. Schott

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**Matrix Analysis for Statistics** By James R. Schott

**A complete, self-contained introduction to matrix analysis theory and practice**

Matrix methods have evolved from a tool for expressing statistical problems to an indispensable part of the development, understanding, and use of various types of complex statistical analyses. This evolution has made matrix methods a vital part of statistical education. Traditionally, matrix methods are taught in courses on everything from regression analysis to stochastic processes, thus creating a fractured view of the topic. This updated second edition of *Matrix Analysis for Statistics* offers readers a unique, unified view of matrix analysis theory and methods.

*Matrix Analysis for Statistics, Second Edition* provides in-depth, step-by-step coverage of the most common matrix methods now used in statistical applications, including eigenvalues and eigenvectors; the Moore-Penrose inverse; matrix differentiation; the distribution of quadratic forms; and more. The subject matter is presented in a theorem/proof format, allowing for a smooth transition from one topic to another. Proofs are easy to follow, and the author carefully justifies every step. Accessible even for readers with a cursory background in statistics, yet rigorous enough for students in statistics, this new edition is the ideal introduction to matrix analysis theory and practice.

## The book features:

- Self-contained chapters, which allow readers to select individual topics or use the reference sequentially
- Extensive examples and chapter-end practice exercises, many of which involve the use of matrix methods in statistical analyses
- New material on elliptical distributions and new expanded coverage of such topics as eigenvalue inequalities and matrices partitioned in 2 by 2 form, in particular, results relating the rank, generalized inverse, eigenvalues of such matrices to their submatrices, and much more
- Optional sections for mathematically advanced readers

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- 480 pages

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## Editorial Review

### Review

"It is very well worth having." (*Journal of the American Statistical Association*, March 2009)

"This book is an excellent beginning place to start learning matrix theory and properties." (*Journal of Statistical Computation and Simulation*, March 2006)

### From the Publisher

Written in a theorem-proof format, this accessible text presents a mathematical development of the matrix theory and methods most commonly used in statistical applications. Self-contained chapters allow flexibility in topic choice and the author has made the proofs as easy to follow as possible, justifying every step except those which should be clearly obvious. Selective material such as eigenvalues and eigenvectors, the Moore-Penrose inverse, matrix differentiation, and the distribution of quadratic forms is thoroughly described. Extensive examples and exercises are incorporated at the end of each chapter.

### From the Back Cover

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