

Accuracy and Stability of Numerical Algorithms

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SECOND
EDITION

Nicholas J. Higham

Accuracy and Stability of Numerical Algorithms gives a thorough, up-to-date treatment of the behavior of numerical algorithms in finite precision arithmetic. It combines algorithmic derivations, perturbation theory, and rounding error analysis, all enlivened by historical perspective and informative quotations.

This second edition expands and updates the coverage of the first edition (1996) and includes numerous improvements to the original material. Two new chapters treat symmetric indefinite systems and skew-symmetric systems, and nonlinear systems and Newton's method. An expanded treatment of Gaussian elimination incorporates rook pivoting and additional error bounds. Other new topics include rank-revealing LU factorizations, weighted and constrained least squares problems, and the fused multiply-add operation found on some modern computer architectures.

Although not designed specifically as a textbook, this new edition is a suitable reference for an advanced course. It can also be used by instructors at all levels as a supplementary text from which to draw examples, historical perspective, statements of results, and exercises.

From reviews of the first edition:

"This definitive source on the accuracy and stability of numerical algorithms is quite a bargain and a worthwhile addition to the library of any statistician heavily involved in computing."
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"This text may become the new Bible about accuracy and stability for the solution of systems of linear equations. It covers 688 pages carefully collected, investigated, and written... One will find that this book is a very suitable and comprehensive reference for research in numerical linear algebra, software usage and development, and for numerical linear algebra courses."
— N. Köckler, *Zentralblatt für Mathematik*, Band 847/96.

"Nick Higham has assembled an enormous amount of important and useful material in a coherent, readable form. His book belongs on the shelf of anyone who has more than a casual interest in rounding error and matrix computations."
— G. W. Stewart, *SIAM Review*, March 1997.



Nicholas J. Higham is Richardson Professor of Applied Mathematics at the University of Manchester, England. He is the author of more than 80 publications and is a member of the editorial boards of *Foundations of Computational Mathematics*, the *IMA Journal of Numerical Analysis*, *Linear Algebra and Its Applications*, and the *SIAM Journal on Matrix Analysis and Applications*.

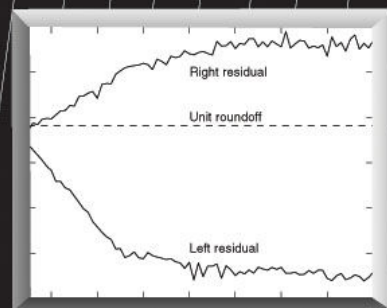
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