<<数值算法的精确性与稳定性>>

图书基本信息

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内容概要

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. twelve new sections include coverage of additional error bounds for gaussian elimination, 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.

作者简介

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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书籍目录

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章节摘录

版权页：插图：It has been 30 years since the publication of Wilkinson's books Rounding Errors in Algebraic Processes [1232, 1963] and The Algebraic Eigenvalue Problem [1233, 1965]. These books provided the first thorough analysis of the effects of rounding errors on numerical algorithms, and they rapidly became highly influential classics in numerical analysis. Although a number of more recent books have included analysis of rounding errors, none has treated the subject in the same depth as Wilkinson.This book gives a thorough, up-to-date treatment of the behaviour of numerical algorithms in finite precision arithmetic. It combines algorithmic derivations, perturbation theory, and rounding error analysis. Software practicalities are emphasized throughout, with particular reference to LAPACK. The best available error bounds, some of them new, are presented in a unified format with a minimum of jargon. Historical perspective is given to provide insight into the development of the subject, and further information is provided in the many quotations. Perturbation theory is treated in detail, because of its central role in revealing problem sensitivity and providing error bounds. The book is unique in that algorithmic derivations and motivation are given succinctly, and implementation details minimized, so that attention can be concentrated on accuracy and stability results. The book was designed to be a comprehensive reference and contains extensive citations to the research literature.Although the book's main audience is specialists in numerical analysis, it will be of use to all computational scientists and engineers who are concerned about the accuracy of their results. Much of the book can be understood with only a basic grounding in numerical analysis and linear algebra.

媒体关注与评论

"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." ——Robert L. Strawderman, Journal of the American Statistical Association, March 1999. "This text may become the new 'Bible' about accuracy and stability for the solution of system 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. Kockler, Zentrablatt for 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 computation." —— G.W. Stewart, SIAM Review, March 1997.

编辑推荐

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