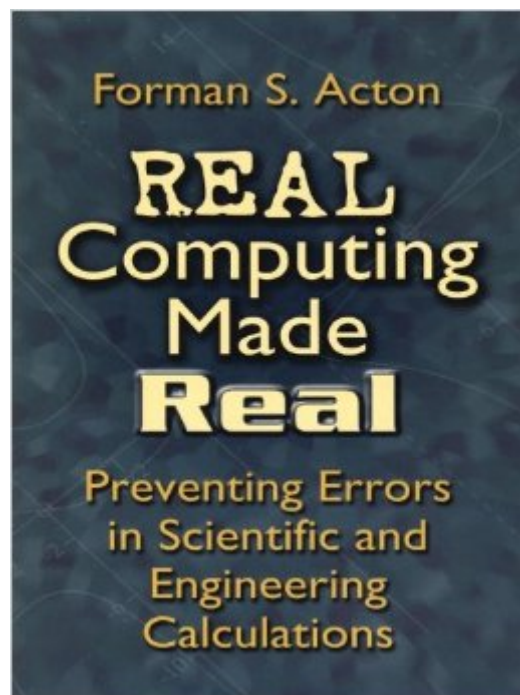# Real Computing Made Real: Preventing Errors In Scientific And Engineering Calculations (Dover Books On Computer Science)

Synopsis

Engineers and scientists who want to avoid insidious errors in their computer-assisted calculations will welcome this concise guide to trouble-shooting. Real Computing Made Real offers practical advice on detecting and removing bugs. It also outlines techniques for preserving significant figures, avoiding extraneous solutions, and finding efficient iterative processes for solving nonlinear equations.Those who compute with real numbers (for example, floating-point numbers stored with limited precision) tend to develop techniques that increase the frequency of useful answers. But although there might be ample guidance for those addressing linear problems, little help awaits those negotiating the nonlinear world. This book, geared toward upper-level undergraduates and graduate students, helps rectify that imbalance. Its examples and exercises (with answers) help readers develop problem-formulating skills and assist them in avoiding the common pitfalls that software packages seldom detect. Some experience with standard numerical methods is assumed, but beginners will find this volume a highly practical introduction, particularly in its treatment of often-overlooked topics.

Book Information

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Customer Reviews

This is a very helpful small book on numerical analysis. It was written by a professor at the Dept. of Computer Science of the Princeton Univ. with an experience in numerical methods of almost half a century (from 1949, the time he took his Ph.D. and started working on programs, to 1996, the time he wrote down the book). It addresses errors of the third kind, that is not those errors that prevent a program from running (first kind, grammar errors) or that make it run faulty (second kind, like wrong array indices), but those errors that make a program inefficient. Examples are: loss of significant digits, iterative instabilities, degenerative inefficiencies in algorithms and convergence to extraneous roots of previously docile equations. Studying Acton's books develops thought habits and programming techniques that will prevent frequent occurrence of those errors that creep into our results so quietly that we don't notice them, until our bridge has collapsed, and that require much time consumption, computational resources and psychological frustration to track down. Acton raises our consciousness about them, mostly by making us work on examples and a generous supply of problems, many with a reasonably detailed solution at the end of the book. A nice feature is that each chapter is introduced by the picture of a Japanese actor sculpture. The book is aimed mainly at upper-level undergraduate and graduate students. It requires some familiarity with numerical work, that is, it does not provide proofs of algorithms, it just builds up our experience in dealing with interesting problems.

Real Computing Made Real: Preventing Errors in Scientific and Engineering Calculations (Dover Books on Computer Science) Computability, Complexity, and Languages, Second Edition: Fundamentals of Theoretical Computer Science (Computer Science and Scientific Computing) United States Paper Money Errors: A Comprehensive Catalog & Price Guide (U.S. Paper Money Errors) Face Image Analysis by Unsupervised Learning (The Kluwer International Series in Engineering and Computer Science, Volume 612) (The Springer International Series in Engineering and Computer Science) The Theory of Matrices, Second Edition: With Applications (Computer Science and Scientific Computing) Elementary Linear Programming with Applications, Second Edition (Computer Science & Scientific Computing Series) HACKING: Beginner's Crash Course - Essential Guide to Practical: Computer Hacking, Hacking for Beginners, & Penetration Testing (Computer Systems, Computer Programming, Computer Science Book 1) Logic for Computer Science: Foundations of Automatic Theorem Proving, Second Edition (Dover Books on Computer Science) Scientific Computing with MATLAB and Octave (Texts in Computational Science and Engineering) Forensic Science: An Introduction to Scientific and Investigative Techniques, Third Edition (Forensic Science: An Introduction to Scientific & Investigative Techniques) Quantum

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