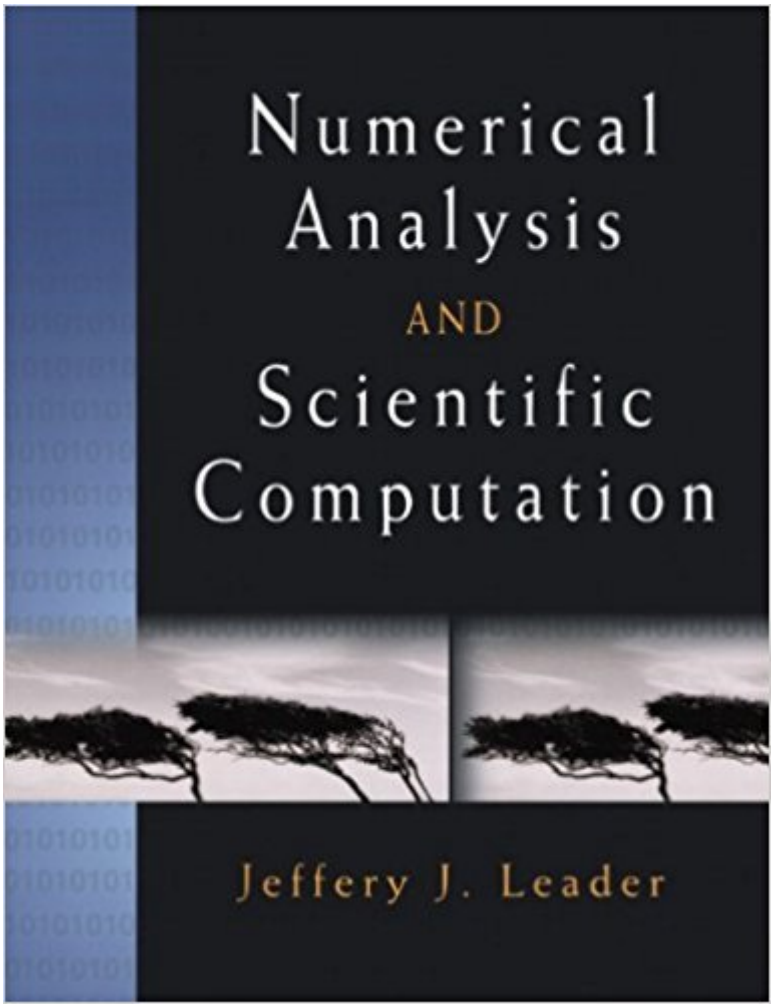
Numerical Analysis And Scientific Computation



Synopsis

This text emphasizes the mathematical ideas behind the methods and the idea of mixing methods for robustness. The optional use of MATLAB is incorporated throughout the book. This text is intended for a first course in Numerical Analysis taken by students majoring in mathematics, engineering, computer science,Ã Â or the sciences. Ã Â Nonlinear Equations, Linear Systems, Iterative Methods, Polynomial Interpolation, Numerical Integration, Differential Equations, Nonlinear Optimization, Approximation Methods Ã Â For all readers interested in numerical analysis and scientific computation.

Book Information

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Customer Reviews

In pretty good condition!

Leader has written this book to reflect several trends in maths during the last 20 years. One has been the rise of symbolic algebra, as exemplified by the success of such packages as Mathematica and Maple. A student who uses those to get analytic solutions to problems might simply fail to appreciate any compelling need for numerical analysis. Thus Leader offers examples of when such symbolic algebra methods fail, and numerical methods are necessary. His examples are good, but I’m not sure they will suffice for some students. Because if a maths student does not appreciate numerical analysis, even before taking any course in it, then is this merely inexperience, which Leader addresses in the book. Or it is that the student is simply not very bright? If the latter, then the book’s efforts might be futile.Another trend which the book reflects is the ready availability of

powerful maths packages that can perform numerical analysis. He chooses to use Matlab. Indeed, if you are already facile in this field, but need to thoroughly learn the capabilities of Matlab, you can use the book as a field guide.It is this which is the main qualitative difference between the book and those of the 70s and 80s, from which I learned the subject. There is now less need to give examples of source code for, say, applying Newton's Method of root finding. Because Matlab (or equivalent packages) already implement the method. So you can concentrate on higher level issues.The order in which he presents various subjects seems logical enough. Though you should not necessarily feel bound by this. Most chapters can be read in any order. One apparent curiosity is how the first chapter is on nonlinear systems. While the second and third chapters are on linear systems. Most texts reverse the order, since linear systems are typically considered simpler, and their analysis can usually be taken much further.It should be said that the nonlinear equations in chapter 1 are actually quite simple. And they let Leader easily introduce such ideas as the above mentioned Newton's Method.

I took Numerical Analysis from Professor Leader before he published this book. He gave all his students in the class his latest draft free of charge. (Which I thought was rather kind of him). I was only a sophmore at the time and a lot of the analysis went over my head, but the Matlab sections were great and have set me up for a lot of Matlab programming that has come my way ever since.As they say Practice and theory are the same in theory, but in practice they aren't. This is all too true for numerical analysis. Leader approaches theory and practice, making both clear. (Though, reader here be warned, some theoritical parts are somewhat thick especially without proper analysis background.)I am currently taking a slightly higher level Numerical Analysis class than the one Leader taught. The book required for the course is "Numerical Analysis," which isn't well written (essential steps are missing, things are skipped, theory isn't well explained, and the "practice" is practically non-existant in the book), so I pulled out Leader's book and found the information I needed to understand for the course and do the homework. (And the programming for the course isn't that difficult since I already have that down from Leader's book.) Leader's book has been a great reference.Another good book in the field is Numerical Methods for Unconstrained Optimization and Nonlinear Equations by J.E. Dennis Jr, and Rober B. Schnabel. (A classic in Applied Mathematics.)In short, Leader's book is good, and Leader is a good guy.I highly recommend the book.

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