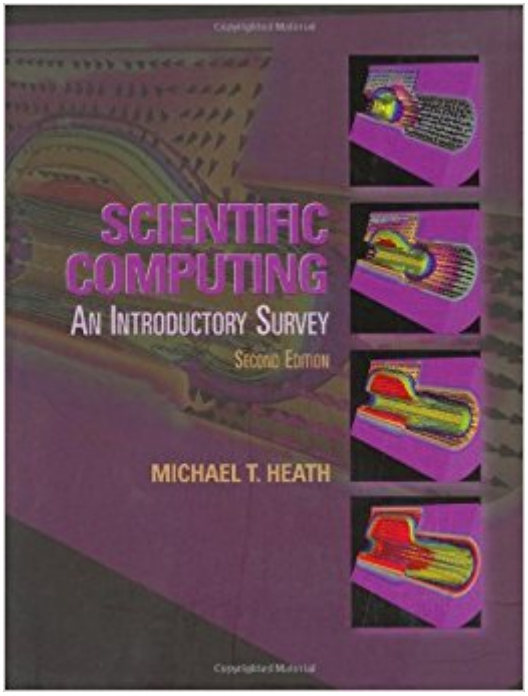
Scientific Computing



Synopsis

Heath 2/e, presents a broad overview of numerical methods for solving all the major problems in scientific computing, including linear and nonlinear equations, least squares, eigenvalues, optimization, interpolation, integration, ordinary and partial differential equations, fast Fourier transforms, and random number generators. The treatment is comprehensive yet concise, software-oriented yet compatible with a variety of software packages and programming languages. The book features more than 160 examples, 500 review questions, 240 exercises, and 200 computer problems. Changes for the second edition include: expanded motivational discussions and examples; formal statements of all major algorithms; expanded discussions of existence, uniqueness, and conditioning for each type of problem so that students can recognize "good" and "bad" problem formulations and understand the corresponding quality of results produced; and expanded coverage of several topics, particularly eigenvalues and constrained optimization. The book contains a wealth of material and can be used in a variety of one- or two-term courses in computer science, mathematics, or engineering. Its comprehensiveness and modern perspective, as well as the software pointers provided, also make it a highly useful reference for practicing professionals who need to solve computational problems.

Book Information

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Customer Reviews

I read this book as a student in Dr. Heath’s course at UIUC, then had to study it more thoroughly for qualifying exams, and I highly recommend it for anyone interested in the subject (subjects listed below). In the text he explains things clearly and carefully, and makes sure to provide motivation for

the topics. It will really help if you haven’t forgotten all your linear algebra and have had some programming experience. The programming problems are easiest to complete in Python or Matlab. If you plan to do them, but don’t have any experience with Python or Matlab, you can learn what you need to know pretty quickly (which would be easier than attempting them in a language not designed for matrix math). I think the book would stand well on its own even if you weren’t taking the course. I would not hesitate to buy other books by Dr. Heath. All textbooks are overpriced and he told us he’d rather sell ten times as many at one tenth of the cost, but the publisher sets the price.The general subject of the book is numerical algorithms (and error estimation) for the following subjects:Systems of Linear equationsLinear Least SquaresEigenvalue ProblemsNonlinear EquationsOptimization ProblemsInterpolationNumerical Integration and DifferentiationInitial Value Problems for ODEsBoundary Value Problems for ODEsPartial Differential EquationsFast Fourier TransformRandom Numbers and Simulation

As some other reviews have pointed out, this book is not the best at giving examples. It gives examples of the concepts, but they are not well explained and skip a lot of steps. If one is familiar with the concepts, then they are great, because they skip right to the point, but it is definitely not the greatest if you are trying to learn the basics of the concepts.What is really good about this book, is that at the end of each chapter, it has a list of the built-in library functions that do the algorithms the chapters talk about, in a bunch of different languages (Matlab, maple, etc). Another good thing is that it gives a basic outline of many of the algorithms.

This edition is exactly the same the as the US version.Good quality and very nice seller, I get this book really quick.It is much cheaper than the bookstore.100% recommend

This text reads well, and does a good job covering the important concepts in scientific computing. The only thing I’ve noticed is sometimes missing specific examples. Sometimes the sample problems are not clear as to what is expected...Overall, its a text that is good to learn from, but maybe not the best for practice(note: i have not yet worked through the computer programming example, these look promising)

Not just a great introduction to the topic but also a great resource for review questions, exercises and computer problems/projects.

good review of scientific computing, the best of this book are the different types of questions at the end of each chapter.

This book is a great buy for advanced mathematics and computing theories. However I have heard several people say they don't know how to use the book and can't decipher it. The book itself does not have enough explanation to be able to use it by yourself (in my opinion). But with a good teacher that can explain the small tips that a book will not publish, this book can be a great tool in the learning process.

As a student I have found this book extremely difficult to learn from. I am a junior in mechanical engineering and have already taken classes concerning differential equations, partial differentials and some linear algebra so a lot of the basic concepts of this book are not new to me. The author seems rushed to introduce as many theories as possible into each chapter and misses many of the key qualities that make some of my other text books great learning tools.1. Lack of examples concerning new theories.2. Too many steps skipped in solving examples where the theory was just introduced3. Useful equations not numbered.4. No chapter summary with chapter highlights.5. No chapter equation/useful formula summary.6. No solutions in the back of the book. This makes it very difficult to study by yourself.It is obvious that this book is very comprehensive and that most of what an engineer would ever need to know on Numerical Methods is discussed in some form. However, the "text book" side is lacking and needs a major overhaul to become a great learning tool.

Concurrent Scientific Computing (Texts in Applied Mathematics) Numerical Recipes with Source Code CD-ROM 3rd Edition: The Art of Scientific Computing Visualization in Scientific Computing (Focus on Computer Graphics) Scientific Computing A First Course in Scientific Computing: Symbolic, Graphic, and Numeric Modeling Using Maple, Java, Mathematica, and Fortran90 by Rubin H. Landau (2005-05-01) The Scientific Endeavor: A Primer on Scientific Principles and Practice Diversity and the Tropical Rain Forest: A Scientific American Library Book (Scientific American Library Series)