



Applied Numerical Methods for Engineers and Scientists

By Singiresu S. Rao

Download now

Read Online 

Applied Numerical Methods for Engineers and Scientists By Singiresu S. Rao

This comprehensive book includes over 800 problems including open ended, project type and design problems. Chapter topics include Introduction to Numerical Methods; Solution of Nonlinear Equations; Simultaneous Linear Algebraic Equations; Solution of Matrix Eigenvalue Problem; Curve Fitting and Interpolation; Statistical Methods; Numerical Differentiation; Numerical Integration; Numerical Solution of Ordinary Differential Equations: Initial Value Problems; Numerical Solution of Ordinary Differential Equations: Boundary Value Problems; Numerical Solution of Partial Differential Equations; Numerical Methods of Optimization ;Finite Element Method. This book is intended as a reference for numerical methods in engineering.

 [Download Applied Numerical Methods for Engineers and Scient ...pdf](#)

 [Read Online Applied Numerical Methods for Engineers and Scie ...pdf](#)

Applied Numerical Methods for Engineers and Scientists

By *Singiresu S. Rao*

Applied Numerical Methods for Engineers and Scientists By Singiresu S. Rao

This comprehensive book includes over 800 problems including open ended, project type and design problems. Chapter topics include Introduction to Numerical Methods; Solution of Nonlinear Equations; Simultaneous Linear Algebraic Equations; Solution of Matrix Eigenvalue Problem; Curve Fitting and Interpolation; Statistical Methods; Numerical Differentiation; Numerical Integration; Numerical Solution of Ordinary Differential Equations: Initial Value Problems; Numerical Solution of Ordinary Differential Equations: Boundary Value Problems; Numerical Solution of Partial Differential Equations; Numerical Methods of Optimization ;Finite Element Method. This book is intended as a reference for numerical methods in engineering.

Applied Numerical Methods for Engineers and Scientists By Singiresu S. Rao Bibliography

- Sales Rank: #933904 in Books
- Published on: 2001-09-29
- Original language: English
- Number of items: 1
- Dimensions: 9.10" h x 2.20" w x 7.00" l, 3.75 pounds
- Binding: Paperback
- 880 pages



[Download Applied Numerical Methods for Engineers and Scient ...pdf](#)



[Read Online Applied Numerical Methods for Engineers and Scie ...pdf](#)

**Download and Read Free Online Applied Numerical Methods for Engineers and Scientists By
Singiresu S. Rao**

Editorial Review

From the Back Cover

The availability of inexpensive high-speed computing power makes the numerical solution of even complex engineering problems economically feasible. In the face of ever-increasing demands on the engineering profession to perform better, students preparing to face the challenges of the twenty-first century should learn not only the theory behind the numerical methods, but also acquire the skills needed to implement the methods for computer solution. In addition, students should be aware of the many commercial software systems available and their appropriate uses in the solution of engineering problems. The student should be in a position to intelligently select and use suitable numerical methods and software systems as the need arises in practice. He or she should solve a given problem using different approaches with a variety of software systems and experiment with the various parameters of the problem. This book is intended for courses on numerical methods at the junior/senior level as well as at the beginning graduate level. The book also serves as a reference for numerical methods in engineering.

Special Features:

- In derivations and developments, steps needed for continuity of understanding have been included to aid the reader at the introductory level.
- A variety of engineering applications are presented. More than 800 problems are included.
- Review questions are given to help students in reviewing and testing their understanding of the text material. These include multiple choice questions, questions with brief answers, true/false questions, questions involving matching of related descriptions, and fill-in-the-blank type questions.
- Several open-ended project- and design-type problems are included at the end of each chapter.
- Examples and problems based on MATLAB, Maple, and Mathcad are included in each chapter.
- Representative Fortran 90 and C programs are given in the book and several additional programs can be found at the course website.
- Helpful appendices describing the basics of Fortran 90, C Language, MATLAB, Maple, Mathcad, and matrix algebra are included.
- Brief biographical information and photographs of scientists and mathematicians who contributed to the development of numerical methods are given in the book.

Excerpt. © Reprinted by permission. All rights reserved.

The use of numerical methods for the analysis, simulation, and design of engineering processes and systems has been increasing at a rapid rate in recent years. The availability of cheap high-speed computing power makes the numerical solution of even complex engineering problems economically feasible. In the face of ever increasing demands on engineering profession to perform better, the students who learn numerical methods in preparing to face the challenges of 21st century should learn not only the theory behind the methods, but also acquire skills to implement the methods for computer solution. In addition, the students should be aware of the many commercial software systems available and their use in the solution of engineering problems. Although a student may not learn all the numerical methods described in this book and use all the software systems available in any one course, he or she should be in a position to intelligently select and use suitable numerical methods and software systems as the need arises in practice.

The use of numerical methods in engineering can be considered partly science and partly art. Thus, a cookbook-type procedure will not be effective in learning the methods. A student should solve a problem using different approaches and a variety of software systems and experiment with the various parameters of the problem. The different results obtained through this process will form an experience base for selecting a suitable method and interpreting the results for a new problem. It is always desirable to compare and verify the results with other available solutions based on engineering judgment and intuition.

This book is intended for courses on numerical methods at the junior and senior level as well as at the beginning graduate level. The book also serves as a reference for numerical methods in engineering. Fortran and C programs, along with illustrative examples, are given in each chapter to implement many of the numerical methods discussed in that chapter. The use of commercial numerical softwares—MATLAB, MAPLE and MATHCAD—in the solution of practical problems is demonstrated in every chapter. Even when a program from a software package is used, we need to understand the basic principles, purpose, and limitations of the program. Often, in many engineering applications, an available standard program cannot be used directly; we need to adapt and modify it. This invariably requires a sound knowledge of the numerical method as well as some computational experience with the method. The book is aimed at presenting numerical methods along with their practical applications in a manner that helps students achieve the goals just outlined.

Organization

Applied Numerical Methods for Engineers is organized into 13 chapters and 6 appendices. Chapter 1 presents an overview of numerical methods, iterative- processes, numerical errors, software available for numerical methods, programming languages, and the various aspects of computer program development. The methods of solving nonlinear equations are given in Chapter 2. The solution of sets of linear algebraic equations is presented in Chapter 3. Both direct and iterative methods are considered. The matrix eigenvalue problem is the topic of Chapter 4. Chapter 5 deals with the methods of curve fitting and interpolation. The probabilistic and statistical methods are considered in Chapter 6. The numerical differentiation and numerical integration are the topics of Chapters 7 and 8, respectively. The numerical solution of ordinary differential equations is considered in Chapters 9 and 10. While Chapter 9 presents the methods of solving initial-value problems, Chapter 10 deals with the solution of boundary-value problems. The numerical solution of partial differential equations is considered in Chapter 11. The optimization and the finite-element methods are presented in Chapters 12 and 13, respectively. Appendices A and B provide the basics of Fortran and C languages while Appendices C, D, and E summarize the basics of MAPLE, MATLAB, and MATHCAD, respectively. A review of matrix algebra is given in Appendix F. Finally, Appendix G presents tables of statistical distributions.

The material of the book provides flexible options for different types of numerical methods courses. A junior and senior level course may cover the basic techniques of Chapters 1, 2, 3, and 5 to 9. A first-level graduate course can cover Chapters 4, 10, 11, 12, and 13 as well. The prerequisites for using the text are elementary calculus, basic concepts of linear algebra, and an introduction to differential equations.

Each topic for *Applied Numerical Methods for Engineers* is self-contained. In derivations and developments, steps needed for continuity of understanding have been included to aid the reader at the introductory level. Representative engineering applications are given at the beginning of each chapter so that the reader can appreciate the practical use and application of the numerical methods presented in that chapter. Many sample problems are solved by using several methods, and the results are compared, discussed, and general conclusions are drawn. Most of the algorithms described in the book are implemented in the form of Fortran and C codes and are made available at the Web site of the book. The use of different commercial software systems, as well as the programs available at the Web site of the book, is illustrated in each chapter.

Features

The specific features of the book include

1. A variety of engineering applications at the beginning of each chapter to illustrate the practicality of the methods considered in that chapter.
2. The presentation of the material in a simple and user-friendly form. Illustrative examples follow the presentation of the topics.
3. A discussion of convergence rate, error, relative performance, and recommendations for the numerical methods.
4. Review questions to help students in reviewing and testing their understanding of the text material. These include multiple choice questions, questions with brief answers, true-false questions, questions involving matching of related descriptions, and fill-in-the-blank type questions. Answers to review questions can be found at the Web site of the book.
5. A summary of important algorithms in the instructor's manual.
6. Over 700 problems, with solutions in the instructor's manual.
7. The inclusion of several open ended, project type and design problems at the end of chapters.
8. Fortran and C programs for many of the methods presented in the book can be found at the Web site of the book.
9. The inclusion of examples and problems based on the use of MATLAB, MAPLE, and MATHCAD in every chapter.
10. References to lead the reader to specialized and advanced literature.
11. Brief biographical information and photographs of scientists and mathematicians who contributed to the development of numerical methods, found at the Web site of the book.

Web site of the book

The Fortran and C programs used in the book, answers to problems, solutions to review questions, and brief biographical information of scientists can be found at the web site of the book:

<http://www.prenhall.com/rao> . Note that the programs and techniques presented in the book and at the web site are intended for use by students in learning the material. Although the material has been tested, no warranty is implied as to their accuracy. I would appreciate receiving any errors found in the book.

Users Review

From reader reviews:

Diana Castillo:

Do you have favorite book? For those who have, what is your favorite's book? Reserve is very important thing for us to understand everything in the world. Each guide has different aim or goal; it means that publication has different type. Some people really feel enjoy to spend their time for you to read a book. They can be reading whatever they consider because their hobby is reading a book. What about the person who don't like looking at a book? Sometime, man or woman feel need book whenever they found difficult problem or perhaps exercise. Well, probably you'll have this Applied Numerical Methods for Engineers and Scientists.

Ruby Chartrand:

The book Applied Numerical Methods for Engineers and Scientists can give more knowledge and information about everything you want. So why must we leave the good thing like a book Applied Numerical Methods for Engineers and Scientists? A few of you have a different opinion about reserve. But one aim that will book can give many details for us. It is absolutely right. Right now, try to closer with your book. Knowledge or data that you take for that, it is possible to give for each other; you can share all of these. Book Applied Numerical Methods for Engineers and Scientists has simple shape but you know: it has great and large function for you. You can appear the enormous world by available and read a publication. So it is very wonderful.

Helen Albertson:

You are able to spend your free time to see this book this e-book. This Applied Numerical Methods for Engineers and Scientists is simple to create you can read it in the park your car, in the beach, train and soon. If you did not include much space to bring the particular printed book, you can buy typically the e-book. It is make you much easier to read it. You can save the actual book in your smart phone. So there are a lot of benefits that you will get when one buys this book.

Brandy Anderson:

On this era which is the greater particular person or who has ability in doing something more are more treasured than other. Do you want to become considered one of it? It is just simple strategy to have that. What you have to do is just spending your time not much but quite enough to get a look at some books. One of several books in the top list in your reading list is Applied Numerical Methods for Engineers and Scientists. This book that is certainly qualified as The Hungry Hills can get you closer in growing to be precious person. By looking way up and review this e-book you can get many advantages.

Download and Read Online Applied Numerical Methods for Engineers and Scientists By Singiresu S. Rao #LXWNS198F6K

Read Applied Numerical Methods for Engineers and Scientists By Singiresu S. Rao for online ebook

Applied Numerical Methods for Engineers and Scientists By Singiresu S. Rao Free PDF d0wnl0ad, audio books, books to read, good books to read, cheap books, good books, online books, books online, book reviews epub, read books online, books to read online, online library, greatbooks to read, PDF best books to read, top books to read Applied Numerical Methods for Engineers and Scientists By Singiresu S. Rao books to read online.

Online Applied Numerical Methods for Engineers and Scientists By Singiresu S. Rao ebook PDF download

Applied Numerical Methods for Engineers and Scientists By Singiresu S. Rao Doc

Applied Numerical Methods for Engineers and Scientists By Singiresu S. Rao Mobipocket

Applied Numerical Methods for Engineers and Scientists By Singiresu S. Rao EPub

LXWNS198F6K: Applied Numerical Methods for Engineers and Scientists By Singiresu S. Rao