Numerical Methods For Scientific And Engineering Computation Ebook By Mk Jain

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Numerical Analysis for Applied Science - Myron B. Allen, III 1997-11-24
Written for graduate students in applied mathematics, engineering and science courses, the purpose of this book is to present topics in "Numerical Analysis" and "Numerical Methods." It will combine the material of both these areas as well as special topics in modern applications. Included at the end of each chapter are a variety of theoretical and computational exercises.
Numerical Analysis and Scientific Computation - Jeffery J. Leader 2004
This text is intended for a first course in Numerical Analysis taken by students majoring in mathematics, engineering, computer science, and the sciences. 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 text.
Numerical Methods for Engineers and Scientists - Joe D. Hoffman 2018-10-03
Emphasizing the finite difference approach for solving differential equations, the second edition of Numerical Methods for Engineers and Scientists presents a methodology for systematically constructing individual computer programs. Providing easy access to accurate solutions to complex scientific and engineering problems, each chapter begins with objectives, a discussion of a representative application, and an outline of special features, summing up with a list of tasks students should be able to complete after reading the chapter- perfect for use as a study guide or for review. The AIAA Journal calls the book "...a good, solid instructional text on the basic tools of numerical analysis."
Numerical Methods - 2022

Fundamentals of Engineering Numerical Analysis - Parviz Moin 2010-08-23
Since the original publication of this book, available computer power has increased greatly. Today, scientific computing is playing an ever more prominent role as a tool in scientific discovery and engineering analysis. In this second edition, the key addition is an introduction to the finite element method. This is a widely used technique for solving partial differential equations (PDEs) in complex domains. This text introduces numerical methods and shows how to develop, analyse, and use them. Complete MATLAB programs for all the worked examples are now available at www.cambridge.org/Moin, and more than 30 exercises have been added. This thorough and practical book is intended as a first course in numerical analysis, primarily for new graduate students in engineering and physical science. Along with mastering the fundamentals of numerical methods, students will learn to write their own computer programs using standard numerical methods.
Numerical Methods for Scientific and Engineering Computation - Mahinder Kumar Jain 1985
Numerical Methods for Scientific and Engineering Computation is appropriate as a text book for the first course and partly for the second course in numerical analysis. The book is largely self-contained, the courses in calculus and matrices are essential. Some of the special features of the book are: classical and recently developed numerical methods are derived from the high speed computation view point; comparative study of the numerical methods is given to bring out advantages and disadvantages in the implementation of the methods; about 300 problems including BIT problems (1964-83) are listed at the end of Chapters 2 - 7, to serve as exercises and extension to the text; answers and hints to the problems at the end of the book as well as the solved examples in the body of the text will help the students to understand the basic concepts.
Numerical Methods (As Per Anna University) - Satteluri R. K. Iyengar 2009
About the Book: This comprehensive textbook covers material for one semester course on Numerical Methods (MA 1251) for B.E./ B. Tech. students of Anna University. The emphasis in the book is on the presentation of fundamentals and theoretical concepts in an intelligible and easy to understand manner. The book is written as a textbook rather than as a problem/guide book. The textbook offers a logical presentation of both the theory and techniques for problem solving to motivate the students in the study and application of Numerical Methods. Examples and Problems in Exercises are used to explain.
Numerical Methods in Scientific Computing: - Germund Dahlquist 2008-09-04
This work addresses the increasingly important role of numerical methods in science and engineering. It combines traditional and well-developed topics with other material such as interval arithmetic, elementary functions, operator series, convergence acceleration, and continued fractions.
Computational Engineering - Introduction to Numerical Methods - Michael Schäfer 2021-07-19
Numerical simulation methods in all engineering disciplines gains more and more importance. The successful and efficient application of such tools requires certain basic knowledge about the underlying numerical techniques. The text gives a practice-oriented introduction in modern numerical methods as they typically are applied in mechanical, chemical, or civil engineering. Problems from heat transfer, structural mechanics, and fluid mechanics constitute a thematical focus of the text. For the basic understanding of the topic aspects of numerical mathematics, natural sciences, computer science, and the corresponding engineering area are simultaneously important. Usually, the necessary information is distributed in different textbooks from the individual disciplines. In the present text the subject matter is presented in a comprehensive multidisciplinary way, where aspects from the different fields are treated insofar as it is necessary for general understanding. Overarching aspects and important questions related to accuracy, efficiency, and cost effectiveness are discussed. The topics are presented in an introductory manner, such that besides basic mathematical standard knowledge in analysis and linear algebra no further prerequisites are necessary. The book is suitable either for self-study or as an accompanying textbook for corresponding lectures. It can be useful for students of engineering disciplines as well as for computational engineers in industrial practice.
Scientific Computing with MATLAB - Alfio Quarteroni 2012-12-06
This textbook is an introduction to Scientific Computing, in which several numerical methods for the computer solution of certain classes of mathematical problems are illustrated. The authors show how to compute the zeros or

the integrals of continuous functions, solve linear systems, approximate functions by polynomials and construct accurate approximations for the solution of differential equations. To make the presentation concrete and appealing, the programming environment Matlab is adopted as a faithful companion.

Numerical Methods for Scientists and Engineers - H.M. Antia 2002-05-01

This book presents an exhaustive and in-depth exposition of the various numerical methods used in scientific and engineering computations. It emphasises the practical aspects of numerical computation and discusses various techniques in sufficient detail to enable their implementation in solving a wide range of problems.

Numerical Analysis and Scientific Computation - Jeffery J. Leader 2022-04-08

This is an introductory single-term numerical analysis text with a modern scientific computing flavor. It offers an immediate immersion in numerical methods featuring an up-to-date approach to computational matrix algebra and an emphasis on methods used in actual software packages, always highlighting how hardware concerns can impact the choice of algorithm. It fills the need for a text that is mathematical enough for a numerical analysis course yet applied enough for students of science and engineering taking it with practical need in mind. The standard methods of numerical analysis are rigorously derived with results stated carefully and many proven. But while this is the focus, topics such as parallel implementations, the Basic Linear Algebra Subroutines, halfto quadruple-precision computing, and other practical matters are frequently discussed as well. Prior computing experience is not assumed. Optional MATLAB subsections for each section provide a comprehensive self-taught tutorial and also allow students to engage in numerical experiments with the methods they have just read about. The text may also be used with other computing environments. This new edition offers a complete and thorough update. Parallel approaches, emerging hardware capabilities, computational modeling, and data science are given greater weight.

NUMERICAL METHODS FOR SCIENTISTS AND ENGINEERS - K. SANKARA RAO 2007-01-01

Primarily written as a textbook, this third edition provides a complete course on numerical methods for undergraduate students in all branches of engineering, postgraduate students in mathematics and physics, and students pursuing courses in Master of Computer Applications (MCA). Besides students, those appearing for competitive examinations, research scholars and professionals engaged in numerical computations, will treasure this edition for its in-depth analysis, systematic treatment and clarity of approach. The third edition has been updated with new material comprising new methods and concepts and additional chapters on Boundary Value Problems and Approximation of Functions. It introduces the basics in computing, stresses on errors in computation, discusses various direct and iterative methods for solving algebraic and transcendental equations and a method for solving a system of nonlinear equations, linear system of equations, matrix inversion and computation of eigenvalues and eigenvectors of a matrix. The book provides a detailed discussion on curve fitting, interpolation and cubic spline interpolation, numerical differentiation and integration. It also presents, various single step and predictor–corrector methods for solving ordinary differential equations, finite difference methods for solving partial differential equations with the concepts of truncation error and stability. Finally, it concludes with a treatment of numerical methods for solving boundary value problems, least squares, Chebyshev, Pade polynomial approximations and Fourier series approximation to a real continuous function. KEY FEATURES Provides altogether about 300 examples, of which about 125 are worked-out examples. Gives detailed hints and solutions to examples under Exercises.

Numerical Methods and Methods of Approximation in Science and Engineering - Karan S. Surana 2018

Numerical Methods and Methods of Approximation in Science and Engineering prepares students and other readers for advanced studies involving applied numerical and computational analysis. Focused on building a sound theoretical foundation, it uses a clear and simple approach backed by numerous worked examples to facilitate understanding of numerical methods and their application. Readers will learn to structure a sequence of operations into a program, using the programming language of their choice; this approach leads to a deeper understanding of the methods and their limitations. Features: Provides a strong theoretical foundation for learning and applying numerical methods Takes a generic approach to engineering analysis, rather than using a specific programming language Built around a consistent, understandable model for conducting engineering analysis Prepares students for advanced coursework, and use of tools such as FEA and CFD Presents numerous detailed examples and problems, and a Solutions Manual for instructors

NUMERICAL METHODS FOR SCIENTIFIC AND ENGINEERING COMPUTATION - JAIN M K 1993

Numerical Methods for Scientists and Engineers - Richard W. Hamming 1986-01-01

This inexpensive paperback edition of a groundbreaking text stresses frequency approach in coverage of algorithms, polynomial approximation, Fourier approximation, exponential approximation, and other topics. Revised and enlarged 2nd edition.

Numerical Methods in Science and Engineering A Practical Approach Rajasekaran S. 2003

During the past two decades,owing to the advent of digital computers,numerical methods of analysis have become very popular for the solution of complex problems in physical and management sciences and in engineering.As the price of hardware keeps decreasing repidly,experts predict that in the near future one may have to pay onliy for sodtware.This underscores the importance of numerical computation to the scientist and engineers and,today,most undergraduates and postgraduates are being given training in the use of computers and access to the computers for the solution of problems.

Numerical Methods for Conservation Laws - Jan S. Hesthaven 2018-01-30

Conservation laws are the mathematical expression of the principles of conservation and provide effective and accurate predictive models of our physical world. Although intense research activity during the last decades has led to substantial advances in the development of powerful computational methods for conservation laws, their solution remains a challenge and many questions are left open; thus it is an active and fruitful area of research. Numerical Methods for Conservation Laws: From Analysis to Algorithms offers the first comprehensive introduction to modern computational methods and their analysis for hyperbolic conservation laws, building on intense research activities for more than four decades of development; discusses classic results on monotone and finite difference/finite volume schemes, but emphasizes the successful development of high-order accurate methods for hyperbolic conservation laws; addresses modern concepts of TVD and entropy stability, strongly stable Runge-Kutta schemes, and limiter-based methods before discussing essentially nonoscillatory schemes, discontinuous Galerkin methods, and spectral methods; explores algorithmic aspects of these methods, emphasizing one- and two-dimensional problems and the development and analysis of an extensive range of methods; includes MATLAB software with which all main methods and computational results in the book can be reproduced; and demonstrates the performance of many methods on a set of benchmark problems to allow direct comparisons. Code and other supplemental material will be available online at publication.

Computational Engineering - Introduction to Numerical Methods - Michael Schäfer 2006-05-01

This book is an introduction to modern numerical methods in engineering. It covers applications in fluid mechanics, structural mechanics, and heat transfer as the most relevant fields for engineering disciplines such as computational engineering, scientific computing, mechanical engineering as well as chemical and civil engineering. The content covers all aspects in the interdisciplinary field which are essential for an "up-to-date" engineer.

Scientific Computing with MATLAB and Octave - Alfio Quarteroni 2010-05-30

Preface to the First Edition This textbook is an introduction to Scienti?c Computing. We will illustrate several

numerical methods for the computer solution of c- tain classes of mathematical problems that cannot be faced by paper and pencil. We will show how to compute the zeros or the integrals of continuous functions, solve linear systems, approximate functions by polynomials and construct accurate approximations for the solution of di?erential equations. With this aim, in Chapter 1 we will illustrate the rules of the game thatcomputersadoptwhenstoringandoperatingwith realandcomplex numbers, vectors and matrices. In order to make our presentation concrete and appealing we will 1 adopt the programming environment MATLAB as a faithful c- panion. We will gradually discover its principal commands, statements and constructs. We will show how to execute all the algorithms that we introduce throughout the book. This will enable us to furnish an - mediate quantitative assessment of their theoretical properties such as stability, accuracy and complexity. We will solve several problems that will be raisedthrough exercises and examples, often stemming from s- ci?c applications.

Numerical methods for scientists and engineers - H. M. Antia 2012-11-15

This book presents an exhaustive and in-depth exposition of the various numerical methods used in scientific and engineering computations. It emphasises the practical aspects of numerical computation and discusses various techniques in sufficient detail to enable their implementation in solving a wide range of problems. The main addition in the third edition is a new Chapter on Statistical Inferences. There is also some addition and editing in the next chapter on Approximations. With this addition 12 new programs have also been added.

A Gentle Introduction to Scientific Computing - Dan Stanescu 2022-05-01

Scientific Computation has established itself as a stand-alone area of knowledge at the borderline between computer science and applied mathematics. Nonetheless, its interdisciplinary character cannot be denied: its methodologies are increasingly used in a wide variety of branches of science and engineering. A Gentle Introduction to Scientific Computing intends to serve a very broad audience of college students across a variety of disciplines. It aims to expose its readers to some of the basic tools and techniques used in computational science, with a view to helping them understand what happens "behind the scenes" when simple tools such as solving equations, plotting and interpolation are used. To make the book as practical as possible, the authors explore their subject both from a theoretical, mathematical perspective and from an implementation-driven, programming perspective. Features Middle-ground approach between theory and implementation. Suitable reading for a broad range of students in STEM disciplines. Could be used as the primary text for a first course in scientific computing. Introduces mathematics majors, without any prior computer science exposure, to numerical methods. All mathematical knowledge needed beyond Calculus (together with the most widely used Calculus notation and concepts) is introduced in the text to make it self-contained.

An Introduction to Scientific Computing - Ionut Danaila 2007-12-03

This book demonstrates scientific computing by presenting twelve computational projects in several disciplines including Fluid Mechanics, Thermal Science, Computer Aided Design, Signal Processing and more. Each follows typical steps of scientific computing, from physical and mathematical description, to numerical formulation and programming and critical discussion of results. The text teaches practical methods not usually available in basic textbooks: numerical checking of accuracy, choice of boundary conditions, effective solving of linear systems, comparison to exact solutions and more. The final section of each project contains the solutions to proposed exercises and guides the reader in using the MATLAB scripts available online.

Python Programming and Numerical Methods - Qingkai Kong 2020-11-27

Python Programming and Numerical Methods: A Guide for Engineers and Scientists introduces programming tools and numerical methods to engineering and science students, with the goal of helping the students to develop good computational problem-solving techniques through the use of numerical methods and the Python programming language. Part One introduces fundamental programming concepts, using simple examples to put new concepts quickly into practice. Part Two covers the fundamentals of algorithms and numerical analysis at a level that allows students to quickly apply results in practical settings. Includes tips, warnings and "try this" features within each chapter to help the reader develop good programming practice Summaries at the end of each chapter allow for quick access to important information Includes code in Jupyter notebook format that can be directly run online

Introduction to Scientific Computing and Data Analysis - Mark H. Holmes 2016-05-30

This textbook provides and introduction to numerical computing and its applications in science and engineering. The topics covered include those usually found in an introductory course, as well as those that arise in data analysis. This includes optimization and regression based methods using a singular value decomposition. The emphasis is on problem solving, and there are numerous exercises throughout the text concerning applications in engineering and science. The essential role of the mathematical theory underlying the methods is also considered, both for understanding how the method works, as well as how the error in the computation depends on the method being used. The MATLAB codes used to produce most of the figures and data tables in the text are available on the author’s website and SpringerLink.

Numerical Methods for Scientists and Engineers - Richard Wesley Hamming 1962

Numerical Solution of Partial Differential Equations in Science and Engineering - Leon Lapidus 2011-02-14

From the reviews of Numerical Solution of PartialDifferential Equations in Science and Engineering: "The book by Lapidus and Pinder is a very comprehensive, evenexhaustive, survey of the subject . . . [It] is unique in that itcovers equally finite difference and finite element methods." Burrelle's "The authors have selected an elementary (but not simplistic)mode of presentation. Many different computational schemes aredescribed in great detail . . . Numerous practical examples andapplications are described from beginning to the end, often withcalculated results given." Mathematics of Computing "This volume . . . devotes its considerable number of pages tolucid developments of the methods [for solving partial differentialequations] . . . the writing is very polished and I found it apleasure to read!" Mathematics of Computation Of related interest . . . NUMERICAL ANALYSIS FOR APPLIED SCIENCE Myron B. Allen andEli L. Isaacson. A modern, practical look at numerical analysis,this book guides readers through a broad selection of numericalmethods, implementation, and basic theoretical results, with anemphasis on methods used in scientific computation involvingdifferential equations. 1997 (0-471-55266-6) 512 pp. APPLIED MATHEMATICS Second Edition, J. David Logan.Presenting an easily accessible treatment of mathematical methodsfor scientists and engineers, this acclaimed work covers fluidmechanics and calculus of variations as well as more modernmethods-dimensional analysis and scaling, nonlinear wavepropagation, bifurcation, and singular perturbation. 1996(0-471-16513-1) 496 pp.

Fundamentals of Numerical Computation - Tobin A Driscoll 2022-08-24

Julia is an open-source and fast-growing programming language for scientific computing that offers clarity and ease of use for beginners but also speed and power for advanced applications. Fundamentals of Numerical Computation: Julia Edition provides a complete solution for teaching Julia in the context of numerical methods. It introduces the mathematics and use of algorithms for the fundamental problems of numerical computation: linear algebra, finding roots, approximating data and functions, and solving differential equations. A clear progression from simple to more advanced methods allows for use in either a one-semester course or a two-semester sequence. The book includes more than 40 functions and 160 examples fully coded in Julia and available for download, online supplemental content including tested source materials for student projects and in-class labs related to every chapter, and over 600 exercises, evenly split between mathematical and computational work, and solutions to most exercises for instructors.

Numerical Computation in Science and Engineering - C. Pozrikidis 1998

Designed for non-expert students and researchers, this text provides an accessible introduction to scientific numerical computation and its applications. It assumes no prior knowledge beyond undergraduate calculus and elementary computer programming. Fundamental and practical issues are discussed in a unified manner with a generous, but not excessive, dose of numerical analysis. The topics are introduced on a need to know basis in order to concisely illustrate the practical implementation of a variety of algorithms and to demystify seemingly esoteric numerical methods. Algorithms that can be explained without too much elaboration and implemented within a few dozen lines of computer code are discussed in detail; those whose underlying theories require long, elaborate explanations are discussed at the level of first principles, and references for further information are given. The book uses schematic illustrations to demonstrate concepts and facilitate understanding by providing readers with a helpful interplay between ideas and visual images. Real-world examples, drawn from various branches of science and engineering, are presented in those cases where it would be difficult for readers to produce their own. The text is further enhanced by an accompanying library of FORTRAN programs, freely available on the World Wide Web at http: //www-ames.ucsd.edu/research/pozrikidis/ncse. Drawing a direct connection between numerical analysis and numerical computation, Numerical Computation in Science and Engineering serves as an ideal text for courses in numerical methods and as a supplement in any course involving numerical computation, including fluid mechanics, solid mechanics, control theory, and thermodynamics.

Numerical Methods for Scientific and Engineering Computation - Tomasz Kopecki 2016-04

NUMERICAL METHODS FOR SCIENTISTS AND ENGINEERS, FOURTH EDITION - Rao, K. Sankara 2017-12-01

With a clarity of approach, this easy-to-comprehend book gives an in-depth analysis of the topics under Numerical Methods, in a systematic manner. Primarily intended for the undergraduate and postgraduate students in many branches of engineering, physics, mathematics and all those pursuing Bachelors/Masters in computer applications. Besides students, those appearing for competitive examinations, research scholars and professionals engaged in numerical computation will also be benefited by this book. The fourth edition of this book has been updated by adding a current topic of interest on Finite Element Methods, which is a versatile method to solve numerically, several problems that arise in engineering design, claiming many advantages over the existing methods. Besides, it introduces the basics in computing, discusses various direct and iterative methods for solving algebraic and transcendental equations and a system of non-linear equations, linear system of equations, matrix inversion and computation of eigenvalues and eigenvectors of a matrix. It also provides a detailed discussion on Curve fitting, Interpolation, Numerical Differentiation and Integration besides explaining various single step and predictor–corrector methods for solving ordinary differential equations, finite difference methods for solving partial differential equations, and numerical methods for solving Boundary Value Problems. Fourier series approximation to a real continuous function is also presented. The text is augmented with a plethora of examples and solved problems along with well-illustrated figures for a practical understanding of the subject. Chapter-end exercises with answers and a detailed bibliography have also been provided. NEW TO THIS EDITION • Includes two new chapters on the basic concepts of the Finite Element Method and Coordinate Systems in Finite Element Methods with Applications in Heat Transfer and Structural Mechanics. • Provides more than 350 examples including numerous worked-out problems. • Gives detailed solutions and hints to problems under Exercises.

Numerical Methods for Scientific and Engineering Computation - Mahinder Kumar Jain 2019

Numerical Methods For Scientific And Engineering Computation - M.K. Jain 2003

Computational Error and Complexity in Science and Engineering - Vangipuram Lakshmikantham 2005-03-04

The book “Computational Error and Complexity in Science and Engineering pervades all the science and engineering disciplines where computation occurs. Scientific and engineering computation happens to be the interface between the mathematical model/problem and the real world application. One needs to obtain good quality numerical values for any real-world implementation. Just mathematical quantities symbols are of no use to engineers/technologists. Computational complexity of the numerical method to solve the mathematical model, also computed along with the solution, on the other hand, will tell us how much computation/computational effort has been spent to achieve that quality of result. Anyone who wants the specified physical problem to be solved has every right to know the quality of the solution as well as the resources spent for the solution. The computed error as well as the complexity provide the scientific convincing answer to these questions. Specifically some of the disciplines in which the book will be readily useful are (i) Computational Mathematics, (ii) Applied Mathematics/Computational Engineering, Numerical and Computational Physics, Simulation and Modelling. Operations Research (both deterministic and stochastic), Computing Methodologies, Computer Applications, and Numerical Methods in Engineering. Key Features: - Describes precisely ready-to-use computational error and complexity - Includes simple easy-to-grasp examples wherever necessary. - Presents error and complexity in error-free, parallel, and probabilistic methods. - Discusses deterministic and probabilistic methods with error and complexity. - Points out the scope and limitation of mathematical error-bounds. - Provides a comprehensive up-to-date bibliography after each chapter. · Describes precisely ready-to-use computational error and complexity · Includes simple easy-to-grasp examples wherever necessary. · Presents error and complexity in error-free, parallel, and probabilistic methods. · Discusses deterministic and probabilistic methods with error and complexity. · Points out the scope and limitation of mathematical error-bounds. · Provides a comprehensive up-to-date bibliography after each chapter.

A First Course in Numerical Methods - Uri M. Ascher 2011-07-14

Offers students a practical knowledge of modern techniques in scientific computing.

Scientific Computing - Bertil Gustafsson 2018-10-03

This book explores the most significant computational methods and the history of their development. It begins with the earliest mathematical / numerical achievements made by the Babylonians and the Greeks, followed by the period beginning in the 16th century. For several centuries the main scientific challenge concerned the mechanics of planetary dynamics, and the book describes the basic numerical methods of that time. In turn, at the end of the Second World War scientific computing took a giant step forward with the advent of electronic computers, which greatly accelerated the development of numerical methods. As a result, scientific computing became established as a third scientific method in addition to the two traditional branches: theory and experimentation. The book traces numerical methods’ journey back to their origins and to the people who invented them, while also briefly examining the development of electronic computers over the years. Featuring 163 references and more than 100 figures, many of them portraits or photos of key historical figures, the book provides a unique historical perspective on the general field of scientific computing – making it a valuable resource for all students and professionals interested in the history of numerical analysis and computing, and for a broader readership alike.

Numerical Methods in Engineering with Python 3 - Jaan Kiusalaas 2013-01-21

Provides an introduction to numerical methods for students in engineering. It uses Python 3, an easy-to-use, high-level programming language.

Numerical Methods in Scientific Computing - Germund Dahlquist 2008

This new book from the authors of the classic book Numerical methods addresses the increasingly important role of

numerical methods in science and engineering. More cohesive and comprehensive than any other modern textbook in the field, it combines traditional and well-developed topics with other material that is rarely found in numerical analysis texts, such as interval arithmetic, elementary functions, operator series, convergence acceleration, and continued fractions. Although this volume is self-contained, more comprehensive treatments of matrix computations will be given in a forthcoming volume. A supplementary Website contains three appendices: an introduction to matrix computations; a description of Mulprec, a MATLAB multiple precision package; and a guide to literature, algorithms, and software in numerical analysis. Review questions, problems, and computer exercises are also included. For use in an introductory graduate course in numerical analysis and for researchers who use numerical methods in science and engineering.

Numerical Analysis in Modern Scientific Computing - Peter Deuflhard 2012-12-06

This book introduces the main topics of modern numerical analysis: sequence of linear equations, error analysis, least squares, nonlinear systems, symmetric eigenvalue problems, three-term recursions, interpolation and approximation, large systems and numerical integrations. The presentation draws on geometrical intuition wherever appropriate and is supported by a large number of illustrations, exercises, and examples.

Computational Methods in Engineering - S.P. Venkateshan 2013-12-09

Computational Methods in Engineering brings to light the numerous uses of numerical methods in engineering. It clearly explains the application of these methods mathematically and practically, emphasizing programming aspects when appropriate. By approaching the cross-disciplinary topic of numerical methods with a flexible approach, Computational Methods in Engineering encourages a well-rounded understanding of the subject. This book's teaching goes beyond the text—detailed exercises (with solutions), real examples of numerical methods in real engineering practices, flowcharts, and MATLAB codes all help you learn the methods directly in the medium that suits you best. Balanced discussion of mathematical principles and engineering applications Detailed step-by-step exercises and practical engineering examples to help engineering students and other readers fully grasp the concepts Concepts are explained through flowcharts and simple MATLAB codes to help you develop additional programming skills