Solution Program Applied Numerical Methods Carnahan

Market_Desc: · Undergraduate and graduate level students of Engineering· Engineers and Researchers using numerical methods Special Features: · A very practical title for students, engineers and researchers who apply numerical methods for solving problems using MATLAB· Includes exercises, problems and solutions with demonstrations through the MATLAB program· Solution Manual available for instructors About The Book: The objective of this book is to make use of the powerful MATLAB software to avoid complex derivations and to teach the fundamental concepts using the software to solve practical problems. The authors use a more practical approach and link every method to real engineering and/or science problems. The main idea is that engineers don t have to know the mathematical theory in order to apply the numerical methods for solving their real-life problems.

The numerical simulation of fluid mechanics and heat transfer problems is now a standard part of engineering practice. The widespread availability of capable computing hardware has led to an increased demand for computer simulations of products and processes during their engineering design and manufacturing phases. The range of fluid mechanics and heat transfer applications of finite element analysis has become quite remarkable, with complex, realistic simulations being carried out on a routine basis. The award-winning first edition of The Finite Element Method in Heat Transfer

and Fluid Dynamics brought this powerful methodology to those interested in applying it to the significant class of problems dealing with heat conduction, incompressible viscous flows, and convection heat transfer. The Second Edition of this bestselling text continues to provide the academic community and industry with up-to-date, authoritative information on the use of the finite element method in the study of fluid mechanics and heat transfer. Extensively revised and thoroughly updated, new and expanded material includes discussions on difficult boundary conditions, contact and bulk nodes, change of phase, weighted-integral statements and weak forms, chemically reactive systems, stabilized methods, free surface problems, and much more. The Finite Element Method in Heat Transfer and Fluid Dynamics offers students a pragmatic treatment that views numerical computation as a means to an end and does not dwell on theory or proof. Mastering its contents brings a firm understanding of the basic methodology, competence in using existing simulation software, and the ability to develop some simpler, special purpose computer codes.

A treatment of numerical methods offering a complete programming code in C. The book takes a step-by-step approach covering each numerical method, which are all illustrated by a worked-out sample program, and examines the pros and cons of alternate methods.

This well-respected text gives an introduction to the theory and application of modern numerical approximation techniques for students taking a one- or two-semester course

in numerical analysis. With an accessible treatment that only requires a calculus prerequisite, Burden and Faires explain how, why, and when approximation techniques can be expected to work, and why, in some situations, they fail. A wealth of examples and exercises develop students' intuition, and demonstrate the subject's practical applications to important everyday problems in math, computing, engineering, and physical science disciplines. The first book of its kind built from the ground up to serve a diverse undergraduate audience, three decades later Burden and Faires remains the definitive introduction to a vital and practical subject. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version.

Steven Chapra's second edition, Applied Numerical Methods with MATLAB for Engineers and Scientists, is written for engineers and scientists who want to learn numerical problem solving. This text focuses on problem-solving (applications) rather than theory, using MATLAB, and is intended for Numerical Methods users; hence theory is included only to inform key concepts. The second edition feature new material such as Numerical Differentiation and ODE's: Boundary-Value Problems. For those who require a more theoretical approach, see Chapra's best-selling Numerical Methods for Engineers, 5/e (2006), also by McGraw-Hill.

Applied Numerical Methods for Engineers and ScientistsPearson

The first notebook (ANA0) aims to introduce the reader to the Mathematica system,

illustrating the concepts and commands that will be required in the basic understanding of the notebooks to follow. The second notebook (ANA1) intends to discuss the questions of precision and accuracy in scientific computation, and how the system deals with fixed and variable precision arithmetic. The next eight notebooks (ANA2 through ANA9) deal with the most common computational tasks in numerical analysis, starting with polynomial interpolation and up to the solution of boundary value problems. The next two notebooks (ANA10 and ANA11) include research work by the authors on the use of the Integral Transform Method in the solution of differential eigenvalue problems and nonlinear partial differential equations, respectively. 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

Discover a simple, direct approach that highlights the basics you need within A FIRST COURSE IN THE FINITE ELEMENT METHOD, 6E. This unique book is written so both undergraduate and graduate readers can easily comprehend the content without the usual prerequisites, such as structural analysis. The book is written primarily as a basic learning tool for those studying civil and mechanical engineering who are primarily interested in stress analysis and heat transfer. The text offers ideal preparation for utilizing the finite element method as a tool to solve practical physical problems. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version.

Initial training in pure and applied sciences tends to present problem-solving as the process of elaborating explicit closed-form solutions from basic principles, and then using these solutions in numerical applications. This approach is only applicable to very limited classes of problems that are simple enough for such closed-form solutions to exist. Unfortunately, most real-life problems are too complex to be amenable to this type of treatment. Numerical Methods – a Consumer Guide presents methods for dealing with them. Shifting the paradigm from formal calculus to numerical computation, the text makes it possible for the reader to · discover how to escape the dictatorship of those particular cases that are simple enough to receive a closed-form solution, and thus gain the ability to solve complex, real-life problems; · understand the principles behind recognized algorithms used in state-of-the-art numerical software; · learn the advantages and limitations of these algorithms, to facilitate the choice of which pre-existing bricks to assemble for solving a given problem; and · acquire methods that allow a critical assessment of numerical results. Numerical Methods – a Consumer Guide will be of interest to

engineers and researchers who solve problems numerically with computers or supervise people doing so, and to students of both engineering and applied mathematics.
The fourth edition of Numerical Methods Using MATLAB® provides a clear and rigorous introduction to a wide range of numerical methods that have practical applications. The authors' approach is to integrate MATLAB® with numerical analysis in a way which adds clarity to the numerical analysis and develops familiarity with MATLAB®. MATLAB® graphics and numerical output are used extensively to clarify complex problems and give a deeper understanding of their nature. The text provides an extensive reference providing numerous useful and important numerical algorithms that are implemented in MATLAB® to help researchers analyze a particular outcome. By using MATLAB® it is possible for the readers to tackle some large and difficult problems and deepen and consolidate their understanding of problem solving using numerical methods. Many worked examples are given together with exercises and solutions to illustrate how numerical methods can be used to study problems that have applications in the biosciences, chaos, optimization and many other fields. The text will be a valuable aid to people working in a wide range of fields, such as engineering, science and economics. Features many numerical algorithms, their fundamental principles, and applications Includes new sections introducing Simulink, Kalman Filter, Discrete Transforms and Wavelet Analysis Contains some new problems and examples Is user-friendly and is written in a conversational and approachable style Contains over 60 algorithms implemented as MATLAB® functions, and over 100 MATLAB® scripts applying numerical algorithms to specific examples
Primarily intended for the B.E./B.Tech., MCA courses as also for undergraduate courses in

Physics and Mathematics, this comprehensive and well-written text covers all the important topics in numerical methods. In the process, it enhances the skill of students in applying numerical methods for solving various problems in Engineering and Science. In this easy-to-read and student-friendly text, the authors present the material in such a way that students can understand and assimilate the basic concepts quickly. Each method is well explained with worked-out examples and self-learning Exercises at the end of each section. While the emphasis of the text is mainly on the working rules, at the same time, it explains the mathematical concepts and applications, wherever necessary. The programs are written in C++ to help the students understand the procedures in an effective manner and to solve more difficult problems. Self-documented programs are given for most of the methods discussed. In recent years, with the introduction of new media products, therehas been a shift in the use of programming languages from FORTRANor C to MATLAB for implementing numerical methods. This book makesuse of the powerful MATLAB software to avoid complex derivations,and to teach the fundamental concepts using the software to solvepractical problems. Over the years, many textbooks have beenwritten on the subject of numerical methods. Based on their courseexperience, the authors use a more practical approach and linkevery method to real engineering and/or science problems. The mainbenefit is that engineers don't have to know the mathematicaltheory in order to apply the numerical methods for solving theirreal-life problems. An Instructor's Manual presenting detailed solutions to all theproblems in the book is available online. As Computational Fluid Dynamics (CFD) and Computational Heat Transfer (CHT) evolve and become increasingly important in standard engineering design and analysis practice, users

require a solid understanding of mechanics and numerical methods to make optimal use of available software. The Finite Element Method in Heat Transfer and Fluid Dynamics, Third Edition illustrates what a user must know to ensure the optimal application of computational procedures—particularly the Finite Element Method (FEM)—to important problems associated with heat conduction, incompressible viscous flows, and convection heat transfer. This book follows the tradition of the bestselling previous editions, noted for their concise explanation and powerful presentation of useful methodology tailored for use in simulating CFD and CHT. The authors update research developments while retaining the previous editions' key material and popular style in regard to text organization, equation numbering, references, and symbols. This updated third edition features new or extended coverage of: Coupled problems and parallel processing Mathematical preliminaries and low-speed compressible flows Mode superposition methods and a more detailed account of radiation solution methods Variational multi-scale methods (VMM) and least-squares finite element models (LSFEM) Application of the finite element method to non-isothermal flows Formulation of low-speed, compressible flows With its presentation of realistic, applied examples of FEM in thermal and fluid design analysis, this proven masterwork is an invaluable tool for mastering basic methodology, competently using existing simulation software, and developing simpler special-purpose computer codes. It remains one of the very best resources for understanding numerical methods used in the study of fluid mechanics and heat transfer phenomena.

Praise for the First Edition ". . . outstandingly appealing with regard to its style, contents, considerations of requirements of practice, choice of examples, and exercises." —Zentrablatt Math ". . . carefully structured with many detailed worked examples . . ." —The Mathematical

Gazette ". . . an up-to-date and user-friendly account . . ." —Mathematika An Introduction to Numerical Methods and Analysis addresses the mathematics underlying approximation and scientific computing and successfully explains where approximation methods come from, why they sometimes work (or don't work), and when to use one of the many techniques that are available. Written in a style that emphasizes readability and usefulness for the numerical methods novice, the book begins with basic, elementary material and gradually builds up to more advanced topics. A selection of concepts required for the study of computational mathematics is introduced, and simple approximations using Taylor's Theorem are also treated in some depth. The text includes exercises that run the gamut from simple hand computations, to challenging derivations and minor proofs, to programming exercises. A greater emphasis on applied exercises as well as the cause and effect associated with numerical mathematics is featured throughout the book. An Introduction to Numerical Methods and Analysis is the ideal text for students in advanced undergraduate mathematics and engineering courses who are interested in gaining an understanding of numerical methods and numerical analysis.
This new edition provides an updated approach for students, engineers, and researchers to apply numerical methods for solving problems using MATLAB® This accessible book makes use of MATLAB® software to teach the fundamental concepts for applying numerical methods to solve practical engineering and/or science problems. It presents programs in a complete form so that readers can run them instantly with no programming skill, allowing them to focus on understanding the mathematical manipulation process and making interpretations of the results. Applied Numerical Methods Using MATLAB®, Second Edition begins with an introduction to MATLAB usage and computational errors, covering everything from input/output

of data, to various kinds of computing errors, and on to parameter sharing and passing, and more. The system of linear equations is covered next, followed by a chapter on the interpolation by Lagrange polynomial. The next sections look at interpolation and curve fitting, nonlinear equations, numerical differentiation/integration, ordinary differential equations, and optimization. Numerous methods such as the Simpson, Euler, Heun, Runge-kutta, Golden Search, Nelder-Mead, and more are all covered in those chapters. The eighth chapter provides readers with matrices and Eigenvalues and Eigenvectors. The book finishes with a complete overview of differential equations. Provides examples and problems of solving electronic circuits and neural networks Includes new sections on adaptive filters, recursive least-squares estimation, Bairstow's method for a polynomial equation, and more Explains Mixed Integer Linear Programing (MILP) and DOA (Direction of Arrival) estimation with eigenvectors Aimed at students who do not like and/or do not have time to derive and prove mathematical results Applied Numerical Methods Using MATLAB®, Second Edition is an excellent text for students who wish to develop their problem-solving capability without being involved in details about the MATLAB codes. It will also be useful to those who want to delve deeper into understanding underlying algorithms and equations.
"There are few books that show how to build programs of any kind. One common theme is compiler building, and there are shelves full of them. There are few others. It's an area, or a void, that needs filling. this book does a great job of showing how to build numerical analysis programs." -David N. Smith, IBM T J Watson Research Center Numerical methods naturally lend themselves to an object-oriented approach. Mathematics builds high- level ideas on top of previously described, simpler ones. Once a property is demonstrated for a given concept, it

can be applied to any new concept sharing the same premise as the original one, similar to the ideas of reuse and inheritance in object-oriented (OO) methodology. Few books on numerical methods teach developers much about designing and building good code. Good computing routines are problem-specific. Insight and understanding are what is needed, rather than just recipes and black box routines. Developers need the ability to construct new programs for different applications. Object-Oriented Implementation of Numerical Methods reveals a complete OO design methodology in a clear and systematic way. Each method is presented in a consistent format, beginning with a short explanation and following with a description of the general OO architecture for the algorithm. Next, the code implementations are discussed and presented along with real-world examples that the author, an experienced software engineer, has used in a variety of commercial applications. Features: Reveals the design methodology behind the code, including design patterns where appropriate, rather than just presenting canned solutions. Implements all methods side by side in both Java and Smalltalk. This contrast can significantly enhance your understanding of the nature of OO programming languages. Provides a step-by-step pathway to new object-oriented techniques for programmers familiar with using procedural languages such as C or Fortran for numerical methods. Includes a chapter on data mining, a key application of numerical methods.
This book is designed for a first course in numerical analysis. It differs considerably from other such texts in its choice of topics.
A comprehensive guide to numerical methods for simulating physical-chemical systems This book offers a systematic, highly accessible presentation of numerical methods used to simulate the behavior of physical-chemical systems. Unlike most books on the subject, it

focuses on methodology rather than specific applications. Written for students and professionals across an array of scientific and engineering disciplines and with varying levels of experience with applied mathematics, it provides comprehensive descriptions of numerical methods without requiring an advanced mathematical background. Based on its author's more than forty years of experience teaching numerical methods to engineering students, Numerical Methods for Solving Partial Differential Equations presents the fundamentals of all of the commonly used numerical methods for solving differential equations at a level appropriate for advanced undergraduates and first-year graduate students in science and engineering. Throughout, elementary examples show how numerical methods are used to solve generic versions of equations that arise in many scientific and engineering disciplines. In writing it, the author took pains to ensure that no assumptions were made about the background discipline of the reader. Covers the spectrum of numerical methods that are used to simulate the behavior of physical-chemical systems that occur in science and engineering Written by a professor of engineering with more than forty years of experience teaching numerical methods to engineers Requires only elementary knowledge of differential equations and matrix algebra to master the material Designed to teach students to understand, appreciate and apply the basic mathematics and equations on which Mathcad and similar commercial software packages are based Comprehensive yet accessible to readers with limited mathematical knowledge, Numerical Methods for Solving Partial Differential Equations is an excellent text for advanced undergraduates and first-year graduate students in the sciences and engineering. It is also a valuable working reference for professionals in engineering, physics, chemistry, computer science, and applied mathematics.

Numerical Analysis with Algorithms and Programming is the first comprehensive textbook to provide detailed coverage of numerical methods, their algorithms, and corresponding computer programs. It presents many techniques for the efficient numerical solution of problems in science and engineering. Along with numerous worked-out examples, end-of-chapter exercises, and Mathematica® programs, the book includes the standard algorithms for numerical computation: Root finding for nonlinear equations Interpolation and approximation of functions by simpler computational building blocks, such as polynomials and splines The solution of systems of linear equations and triangularization Approximation of functions and least square approximation Numerical differentiation and divided differences Numerical quadrature and integration Numerical solutions of ordinary differential equations (ODEs) and boundary value problems Numerical solution of partial differential equations (PDEs) The text develops students' understanding of the construction of numerical algorithms and the applicability of the methods. By thoroughly studying the algorithms, students will discover how various methods provide accuracy, efficiency, scalability, and stability for large-scale systems. Interpolation and approximation; Numerical integration; Solution of equations; Matrices and related topics; Systems of equations; The approximation of the solution of ordinary differential equations; Approximation of the solution of partial differential equations; Statistical methods. Applied Engineering Analysis Tai-Ran Hsu, San Jose State University, USA A resource book applying mathematics to solve engineering problems Applied Engineering Analysis is a concise textbookwhich demonstrates how toapply mathematics to solve engineering problems. It begins with an overview of engineering analysis and an introduction to mathematical modeling, followed by vector calculus, matrices and linear algebra, and applications of first and second

order differential equations. Fourier series and Laplace transform are also covered, along with partial differential equations, numerical solutions to nonlinear and differential equations and an introduction to finite element analysis. The book also covers statistics with applications to design and statistical process controls. Drawing on the author's extensive industry and teaching experience, spanning 40 years, the book takes a pedagogical approach and includes examples, case studies and end of chapter problems. It is also accompanied by a website hosting a solutions manual and PowerPoint slides for instructors. Key features: Strong emphasis on deriving equations, not just solving given equations, for the solution of engineering problems. Examples and problems of a practical nature with illustrations to enhance student's self-learning. Numerical methods and techniques, including finite element analysis. Includes coverage of statistical methods for probabilistic design analysis of structures and statistical process control (SPC). Applied Engineering Analysis is a resource book for engineering students and professionals to learn how to apply the mathematics experience and skills that they have already acquired to their engineering profession for innovation, problem solving, and decision making.

A FIRST COURSE IN THE FINITE ELEMENT METHOD provides a simple, basic approach to the course material that can be understood by both undergraduate and graduate students without the usual prerequisites (i.e. structural analysis). The book is written primarily as a basic learning tool for the undergraduate student in civil and mechanical engineering whose main interest is in stress analysis and heat transfer. The text is geared toward those who want to apply the finite element method as a tool to solve practical physical problems. Important Notice: Media content referenced within the product description or the product text may not be

available in the ebook version.

Numerical Algorithms: Methods for Computer Vision, Machine Learning, and Graphics presents a new approach to numerical analysis for modern computer scientists. Using examples from a broad base of computational tasks, including data processing, computational photography, and animation, the textbook introduces numerical modeling and algorithmic desig

Written from the expertise of an agricultural engineering background, this exciting new book presents the most useful numerical methods and their complete program listings.

An accessible introduction to the finite element method for solving numeric problems, this volume offers the keys to an important technique in computational mathematics. Suitable for advanced undergraduate and graduate courses, it outlines clear connections with applications and considers numerous examples from a variety of science- and engineering-related specialties.This text encompasses all varieties of the basic linear partial differential equations, including elliptic, parabolic and hyperbolic problems, as well as stationary and time-dependent problems. Additional topics include finite element methods for integral equations, an introduction to nonlinear problems, and considerations of unique developments of finite element techniques related to parabolic problems, including methods for automatic time step control. The relevant mathematics are

expressed in non-technical terms whenever possible, in the interests of keeping the treatment accessible to a majority of students.

"A companion book including interactive software for students and professional engineers who want to utilize problem-solving software to effectively and efficiently obtain solutions to realistic and complex problems. An Invaluable reference book that discusses and Illustrates practical numerical problem solving in the core subject areas of Chemical Engineering. Problem Solving in Chemical Engineering with Numerical Methods provides an extensive selection of problems that require numerical solutions from throughout the core subject areas of chemical engineering. Many are completely solved or partially solved using POLYMATH as the representative mathematical problem-solving software, Ten representative problems are also solved by Excel, Maple, Mathcad, MATLAB, and Mathematica. All problems are clearly organized and all necessary data are provided. Key equations are presented or derived. Practical aspects of efficient and effective numerical problem solving are emphasized. Many complete solutions are provided within the text and on the CD-ROM for use in problem-solving exercises."--BOOK JACKET.Title Summary field provided by Blackwell North America, Inc. All Rights Reserved

"This 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; and more." (Midwest).
Numerical Methods for Partial Differential Equations: An Introduction Vitoriano Ruas, Sorbonne Universités, UPMC - Université Paris 6, France A comprehensive overview of techniques for the computational solution of PDE's Numerical Methods for Partial Differential Equations: An Introduction covers the three most popular methods for solving partial differential equations: the finite difference method, the finite element method and the finite volume method. The book combines clear descriptions of the three methods, their reliability, and practical implementation aspects. Justifications for why numerical methods for the main classes of PDE's work or not, or how well they work, are supplied and exemplified. Aimed primarily at students of Engineering, Mathematics, Computer Science, Physics and Chemistry among others this book offers a substantial insight into the principles numerical methods in this class of problems are based upon. The book can also be used as a reference for research work on numerical methods for PDE's. Key features: • A balanced emphasis is given to both practical considerations and a rigorous mathematical treatment. • The reliability analyses for the three methods are carried out in a unified framework and in a

structured and visible manner, for the basic types of PDE's. • Special attention is given to low order methods, as practitioner's overwhelming default options for everyday use. • New techniques are employed to derive known results, thereby simplifying their proof. • Supplementary material is available from a companion website.

Roots of algebraic and transcendental equations. Roots of simultaneous equations. Eigenvalue problems. Ordinary differential equations. Numerical interpolation and curve fitting. Numerical differentiation and integration. Glossary of computer terms. Hex (ASCII table). Time units. Number conversion techniques. RS-232C interface connections. Problems and exercises. Offers students a practical knowledge of modern techniques in scientific computing.

This textbook develops the fundamental skills of numerical analysis: designing numerical methods, implementing them in computer code, and analyzing their accuracy and efficiency. A number of mathematical problems?interpolation, integration, linear systems, zero finding, and differential equations?are considered, and some of the most important methods for their solution are demonstrated and analyzed. Notable features of this book include the development of Chebyshev methods alongside more classical ones; a dual

emphasis on theory and experimentation; the use of linear algebra to solve problems from analysis, which enables students to gain a greater appreciation for both subjects; and many examples and exercises. Numerical Analysis: Theory and Experiments is designed to be the primary text for a junior- or senior-level undergraduate course in numerical analysis for mathematics majors. Scientists and engineers interested in numerical methods, particularly those seeking an accessible introduction to Chebyshev methods, will also be interested in this book.

Mathematics is playing an ever more important role in the physical and biological sciences, provoking a blurring of boundaries between scienti?c disciplines and a resurgence of interest in the modern as well as the cl- sical techniques of applied mathematics. This renewal of interest, both in research and teaching, has led to the establishment of the series: Texts in Applied Mathematics (TAM). Thedevelopmentofnewcoursesisanaturalconsequenceofahighlevelof excitement on the research frontier as newer techniques, such as numerical and symbolic computer systems, dynamical systems, and chaos, mix with and reinforce the traditional methods of applied mathematics. Thus, the purpose of this textbook series is to meet the current and future needs of these advances and to encourage the teaching of new courses. TAM will publish textbooks suitable for use in advanced undergraduate and beginning graduate courses, and will complement the Applied Ma- ematical Sciences (AMS) series, which will focus on advanced textbooks and research-level monographs.

"This book is appropriate for an applied numerical analysis course for upper-level undergraduate and graduate students as well as computer science students. Actual programming is not covered, but an extensive range of topics includes round-off and function evaluation, real zeros of a function, integration, ordinary differential equations, optimization, orthogonal functions, Fourier series, and much more. 1989 edition"--Provided by publisher. The fifth edition of "Numerical Methods for Engineers" continues its tradition of excellence. Instructors love this text because it is a comprehensive text that is easy to teach from. Students love it because it is written for them--with great pedagogy and clear explanations and examples throughout. The text features a broad array of applications, including all engineering disciplines. The revision retains the successful pedagogy of the prior editions. Chapra and Canale's unique approach opens each part of the text with sections called Motivation, Mathematical Background, and Orientation, preparing the student for what is to come in a motivating and engaging manner. Each part closes with an Epilogue containing sections called Trade-Offs, Important Relationships and Formulas, and Advanced Methods and Additional References. Much more than a summary, the Epilogue deepens understanding of what has been learned and provides a peek into more advanced methods. Approximately 80% of the end-of-chapter problems are revised or new to this edition. The expanded breadth of engineering disciplines covered is especially evident in the problems, which now cover such areas as biotechnology and biomedical engineering. Users will find use of software packages, specifically MATLAB and Excel with VBA. This includes material on developing MATLAB m-files and VBA macros.
A concise introduction to numerical methodsand the mathematicalframework neededto

understand their performance Numerical Solution of Ordinary Differential Equationspresents a complete and easy-to-follow introduction to classicaltopics in the numerical solution of ordinary differentialequations. The book's approach not only explains the presentedmathematics, but also helps readers understand how these numericalmethods are used to solve real-world problems. Unifying perspectives are provided throughout the text, bringingtogether and categorizing different types of problems in order tohelp readers comprehend the applications of ordinary differentialequations. In addition, the authors' collective academic experienceensures a coherent and accessible discussion of key topics,including: Euler's method Taylor and Runge-Kutta methods General error analysis for multi-step methods Stiff differential equations Differential algebraic equations Two-point boundary value problems Volterra integral equations Each chapter features problem sets that enable readers to testand build their knowledge of the presented methods, and a relatedWeb site features MATLAB® programs that facilitate theexploration of numerical methods in greater depth. Detailedreferences outline additional literature on both analytical andnumerical aspects of ordinary differential equations for furtherexploration of individual topics. Numerical Solution of Ordinary Differential Equations isan excellent textbook for courses on the numerical solution ofdifferential equations at the upper-undergraduate and beginninggraduate levels. It also serves as a valuable reference forresearchers in the fields of mathematics and engineering.