Ascher Numerical Methods

A First Course in Numerical Methods
Computer Methods for Ordinary Differential Equations and Differential-Algebraic Equations
Numerical Methods for Partial Differential Equations
Computer Methods for Ordinary Differential Equations and Differential-Algebraic Equations
Finite Difference Methods for Ordinary and Partial Differential Equations
Numerical Solution of Initial-value Problems in Differential-algebraic Equations
A First Course in Numerical Analysis
Numerical Methods for Ordinary Differential Equations
Numerical Methods for PDEs
Numerical Methods for Ordinary Differential Systems
Numerical Methods and Analysis
Modern Numerical Methods for Ordinary Differential Equations
A First Course in Ordinary Differential Equations
Numerical Boundary Value ODEs
Numerical Methods for Chemical Engineering
Handbook of Numerical Analysis
Elements of Numerical Analysis with Mathematica®
Numerical Analysis
The Birth of Numerical Analysis
Numerical Methods for Engineers and Scientists, Second Edition,
Numerical Methods for Delay Differential Equations
Numerical Solution of Ordinary Differential Equations
Introduction to Numerical Methods for Variational Problems
Numerical Methods for Fractional Calculus
Numerical Methods
The Courant–Friedrichs–Lewy (CFL) Condition
A First Course in Numerical Methods
Numerical Analysis
An Introduction to Numerical Analysis
Numerical Methods in Scientific Computing
Numerical Methods for Scientists and Engineers
Analysis of Numerical Methods
Numerical Methods for Differential Equations and Applications
Numerical Solution of Ordinary Differential Equations
Numerical Methods and Applications
Numerical Solution of Partial Differential Equations
Numerical Methods that Work
Numerical Solution of Boundary Value Problems for Ordinary Differential Equations
Numerical Methods for Evolutionary Differential Equations
Dynamical Systems and Numerical Analysis

MOYER HOWE

A First Course in Numerical Methods Springer Science & Business
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."
Computer Methods for Ordinary Differential Equations and Differential-Algebraic Equations World Scientific Publishing Company
This volume comprises a carefully selected collection of articles emerging from and pertinent to the 2010 CFL-80 conference in Rio de Janeiro, celebrating the 80th anniversary of the Courant-Friedrichs-Lewy (CFL) condition. A major result in the field of numerical analysis, the CFL condition has influenced the research of many important mathematicians over the past eight decades, and this work is meant to take stock of its most important and current applications. The Courant–Friedrichs–Lewy (CFL) Condition: 80 Years After its Discovery will be of interest to practicing mathematicians, engineers, physicists, and graduate students who work with numerical methods.
Numerical Methods for Partial Differential Equations John Wiley & Sons
Applications of numerical mathematics and scientific computing to chemical engineering.
Computer Methods for Ordinary Differential Equations and Differential-Algebraic Equations SIAM
This book is written for engineers and other practitioners using numerical methods in their work and serves as a textbook for courses in applied mathematics and numerical analysis.
Finite Difference Methods for Ordinary and Partial Differential

Equations SIAM
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 Solution of Initial-value Problems in Differential-algebraic Equations Springer Science & Business Media
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.
A First Course in Numerical Analysis SIAM
The first three chapters contain the elements of the theory of dynamical systems and the numerical solution of initial-value problems. In the remaining chapters, numerical methods are formulated as dynamical systems and the convergence and stability properties of the methods are examined.
Numerical Methods for Ordinary Differential Equations SIAM
Outstanding text, oriented toward computer solutions, stresses errors in methods and computational efficiency. Problems — some strictly mathematical, others requiring a computer — appear at the end of each chapter.
Numerical Methods for PDEs CRC Press
Numerical Methods for Partial Differential Equations, Second Edition deals with the use of numerical methods to solve partial differential equations. In addition to numerical fluid mechanics, hopscotch and other explicit-implicit methods are also considered, along with Monte Carlo techniques, lines, fast Fourier transform, and fractional steps methods. Comprised of six chapters, this volume begins with an introduction to numerical calculation, paying particular attention to the classification of equations and physical problems, asymptotics, discrete methods, and dimensionless forms. Subsequent chapters focus on parabolic and hyperbolic equations, elliptic equations, and special topics ranging from singularities and shocks to Navier-Stokes equations and Monte Carlo methods. The final chapter discuss the general concepts of weighted residuals, with emphasis on orthogonal collocation and the Bubnov-Galerkin method. The latter procedure is used to introduce finite elements. This book should be a valuable resource for students and practitioners in the fields of computer science and applied mathematics.
Numerical Methods for Ordinary Differential Systems Springer Science & Business Media
This excellent text for advanced undergraduate and graduate students covers norms, numerical solutions of linear systems and matrix factoring, eigenvalues and eigenvectors, polynomial approximation, and more. Many examples and problems. 1966 edition.
Numerical Methods and Analysis Springer Science & Business Media
This textbook teaches finite element methods from a computational point of view. It focuses on how to develop flexible computer programs with Python, a programming language in which a combination of symbolic and numerical tools is used to achieve an explicit and practical derivation of finite element algorithms. The finite element library FEniCS is used throughout the book, but the content is provided in sufficient detail to ensure that students with less mathematical background or mixed programming-language experience will equally benefit. All program examples are available on the Internet.
Modern Numerical Methods for Ordinary Differential Equations Cambridge University Press
In the past few years, knowledge about methods for the numerical solution of two-point boundary value problems has increased significantly. Important theoretical and practical advances have been made in a number or fronts, although they are not adequately described in any tt'xt currently available. With this in mind, we organized an international workshop, devoted solely to this topic. Tht' workshop took place in Vancouver, B.C., Canada, in July 1()"13, 1984. This volume contains the refereed proceedings of the workshop. Contributions to the workshop were in two formats. There were a small number of invited talks (ten of which are presented in this proceedings); the other contributions were in the rorm or poster sessions, for which there was no parallel activity in the workshop. We had attemptt'd to cover a number of topics and objectives in the talks. As a result, the general review papt'rs of O'Malley and Russell are intended to take a broader perspective, while the other papers are more specific. The contributions in this volume are divided (somewhat arbitrarily) into five groups. The first group concerns fundamental issues like conditioning and decoupling, which have only rect'ntly gained a proper appreciation of their centrality. Understanding of certain aspects or shooting methods ties in with these fundamental concepts. The papers of Russell, dt' Hoog and Mattheij all deal with these issues.
A First Course in Ordinary Differential Equations SIAM
Offers students a practical knowledge of modern techniques in scientific computing.
Numerical Boundary Value ODEs Cambridge University Press
Designed for those people who want to gain a practical knowledge of modern techniques, this book contains all the material necessary for a course on the numerical solution of

differential equations. Written by two of the field's leading authorities, it provides a unified presentation of initial value and boundary value problems in ODEs as well as differential-algebraic equations. The approach is aimed at a thorough understanding of the issues and methods for practical computation while avoiding an extensive theorem-proof type of exposition. It also addresses reasons why existing software succeeds or fails. This book is a practical and mathematically well-informed introduction that emphasizes basic methods and theory, issues in the use and development of mathematical software, and examples from scientific engineering applications. Topics requiring an extensive amount of mathematical development, such as symplectic methods for Hamiltonian systems, are introduced, motivated, and included in the exercises, but a complete and rigorous mathematical presentation is referenced rather than included.
Numerical Methods for Chemical Engineering Courier Corporation
Here we present numerical analysis to advanced undergraduate and master degree level grad students. This is to be done in one semester. The programming language is Mathematica. The mathematical foundation and technique is included. The emphasis is geared toward the two major developing areas of applied mathematics, mathematical finance and mathematical biology. Contents: BeginningsLinear Systems and OptimizationInterpolating and FittingNumerical DifferentiationNumerical IntegrationNumerical Ordinary Differential EquationsMonte Carlo Method Readership: Undergraduate and master students.
Handbook of Numerical Analysis SIAM
Many physical problems are most naturally described by systems of differential and algebraic equations. This book describes some of the places where differential-algebraic equations (DAE's) occur. The basic mathematical theory for these equations is developed and numerical methods are presented and analyzed. Examples drawn from a variety of applications are used to motivate and illustrate the concepts and techniques. This classic edition, originally published in 1989, is the only general DAE book available. It not only develops guidelines for choosing different numerical methods, it is the first book to discuss DAE codes, including the popular DASSL code. An extensive discussion of backward differentiation formulas details why they have emerged as the most popular and best understood class of linear multistep methods for general DAE's. New to this edition is a chapter that brings the discussion of DAE software up to date. The objective of this monograph is to advance and consolidate the existing research results for the numerical solution of DAE's. The authors present results on the analysis of numerical methods, and also show how these results are relevant for the solution of problems from applications. They develop guidelines for problem formulation and effective use of the available mathematical software and provide extensive references for further study.
Elements of Numerical Analysis with Mathematica® John Wiley & Sons
This is the 2005 second edition of a highly successful and well-respected textbook on the numerical techniques used to solve partial differential equations arising from mathematical models in science, engineering and other fields. The authors maintain an emphasis on finite difference methods for simple but representative examples of parabolic, hyperbolic and elliptic equations from the first edition. However this is augmented by new sections on finite volume methods, modified equation analysis, symplectic integration schemes, convection-diffusion problems, multigrid, and conjugate gradient methods; and several sections, including that on the energy method of analysis, have been extensively rewritten to reflect modern developments. Already an excellent choice for students and teachers in mathematics, engineering and computer science departments, the revised text includes more latest theoretical and industrial developments.
Numerical Analysis Oxford University Press, USA
The main purpose of the book is to introduce the readers to the numerical integration of the Cauchy problem for delay differential equations (DDEs). Peculiarities and differences that DDEs exhibit with respect to ordinary differential equations are preliminarily outlined by numerous examples illustrating some unexpected, and often surprising, behaviours of the analytical and numerical solutions. The effect of various kinds of delays on the regularity of the solution is described and some essential existence and uniqueness results are reported. The book is centered on the use of Runge-Kutta methods continuously extended by polynomial interpolation, includes a brief review of the various approaches existing in the literature, and develops an exhaustive error and well-posedness analysis for the general classes of one-step and multistep methods. The book presents a comprehensive development of continuous extensions of Runge-Kutta methods which are of interest also in the numerical treatment of more general problems such as dense output, discontinuous equations, etc. Some deeper insight into convergence and superconvergence of continuous Runge-Kutta methods is carried out for DDEs with various kinds of delays. The stepsize control mechanism is also developed on a firm mathematical basis relying on the discrete and continuous local error estimates. Classical results and a unconventional analysis of "stability with respect to forcing term" is reviewed for ordinary differential equations in view of the subsequent numerical stability analysis. Moreover, an exhaustive description of stability domains for some test DDEs is carried out and the corresponding stability requirements for the numerical methods are assessed and investigated. Alternative approaches, based on suitable formulation of DDEs as partial differential equations and subsequent semidiscretization are briefly described and compared with the classical approach. A list of available codes is provided, and illustrative examples, pseudo-codes and numerical experiments are included throughout the book.
The Birth of Numerical Analysis Academic Press
This book introduces finite difference methods for both ordinary differential equations (ODEs) and partial differential equations (PDEs) and discusses the similarities and differences between algorithm design and stability analysis for different types of equations. A unified view of stability theory for ODEs and PDEs is presented, and the interplay between ODE and PDE analysis is stressed. The text emphasizes standard classical methods, but several newer approaches also are introduced and are described in the context of simple motivating examples.
Numerical Methods for Engineers and Scientists, Second Edition, CRC Press
This book contains all the material necessary for a course on the numerical solution of differential equations.