The Numerical Solution Of Integral Equations Of The Second Kind | 1e65695232b54e96b9109b4a39cc6656


This is the second edition of the book which has two additional new chapters on Maxwell's equations as well as a section on properties of solution spaces of Maxwell's equations and their trace spaces. These two new chapters, which summarize the most up-to-date results in the literature for Maxwell's equations, are sufficient enough to serve as a self-contained introductory book on the modern mathematical theory of boundary integral equations in electromagnetics. The book now contains 12 chapters and is divided into two parts. The first six chapters present modern mathematical theory of boundary integral equations that arise in fundamental problems in continuum mechanics and electromagnetics based on the approach of variational formulations of the equations. The second six chapters present an introduction to basic classical theory of the pseudo-differential operators. The aforementioned corresponding boundary integral operators can now be recast as pseudo-differential operators. These serve as concrete examples that illustrate the basic ideas of how a may apply the theory of pseudo-differential operators and their calculus to obtain additional properties for the corresponding boundary integral operators. These two different approaches are complementary to each other. Both serve as the mathematical foundation of the boundary element methods, which have become extremely popular and efficient computational tools for boundary problems in applications. This new edition contains a wide spectrum of new topics for the two ways of proceeding, together with explanations of how and why integral equation formalisms arise. In addition, the programme reflected the broad classification of most integral equations as either singular or non singular, as either Fredholm or Volterra and as either first or second kind. This monograph presents the theory and modern numerical analysis of Volterra integral and integro-differential equations, including equations with weakly singular kernels. While the research worker will find an up-to-date account of recent developments of numerical methods for such equations, including an extensive bibliography, the authors have tried to make the book accessible to the non-specialist possessing only a limited knowledge of numerical analysis. After an introduction to the theory of Volterra equations and to numerical integration, the book covers linear methods and Runge-Kutta methods, collocation methods based on polynomial spline functions, stability of numerical methods, and it surveys computer programs for Volterra integral and integro-differential equations.

This publication reports the proceedings of a one-day seminar on The Application and Numerical Solution of Integral Equations held at the Australian National University on Wednesday, November 29, 1978. It was organized by the Computing Research Group, Australian National University and the Division of Mathematics and Statistics, CSIRO. Due to unforeseen circumstances, Dr M.L. Dow was unable to participate. At short notice, Professor D. Elliott reviewed Cauchy singular integral equations, but a paper on same is not included in these proceedings. The interested reader is referred to the recent translation of V.V. Ivanov, The Theory of Approximate Methods and their Application to the Numerical Solution of Singular Integral Equations, Noordhoff International Publishers, Leyden, 1976. An attempt was made to structure the program to the extent that the emphasis was on the numerical solution of integral equations for which known applications exist along with explanations of points on which integral equation formalisms arise. In addition, the programme reflected the broad classification of most integral equations as either singular or non-singular, as either Fredholm or Volterra and as either first or second kind. Linear Integral Equations for Conservative Problems explains the numerical solution of differential equations within the framework of geometric integration, a branch of automatic analysis that devises geometric algorithms able to reproduce (in the discrete solution) relevant geometric properties of the continuous vector field. The book focuses on a large set of differential systems named conservative problems, particularly Hamiltonian systems. Assuming only basic knowledge of numerical quadrature and Runge-Kutta methods, this self-contained book begins with an introduction to the line integral methods. It describes numerous Hamiltonian problems encountered in a variety of applications and presents theoretical results concerning the main instance of line integral methods: the energy-conserving Runge-Kutta methods, also known as Hamiltonian boundary value methods (HBVMs). The authors go on to address the implementation of HBVMs in order to recover in the numerical solution what was expected from the theory. The book also covers the application of HBVMs to handle the numerical solution of Hamiltonian partial differential equations (PDEs) and explores extensions of the energy-conserving methods. With many examples of applications, this book provides an accessible guide to the subject yet gives you enough details to allow concrete use of the methods. MATLAB codes for implementing the methods are available online.

The result of the author's fascination with the mathematical beauty of integral equations, this book combines theory, applications, and numerical methods, and covers each of these fields with the same weight. In order to make the book accessible to mathematicians, physicists, and engineers alike, the author has made it as self-contained as possible, requiring only a solid foundation in differential and integral calculus. The functional analysis which is necessary for an extensive treatment of the theory and the numerical solution of integral equations is developed within the book itself. Problems are included at the end of each chapter. Linear and Nonlinear Integral Equations: Methods and Applications is a self-contained book divided into two parts. Part I offers a comprehensive and systematic treatment of linear integral equations of the first and second kinds. The text brings together newly developed methods to reinforce and complement the existing procedures for solving linear integral equations. The Volterra integral and integro-differential equations, the Fredholm integral and integro-differential equations, the Volterra-Fredholm integral equations, singular and weakly singular integral equations, and systems of these equations, are handled in this part by using many different computational schemes. Selected worked-through examples and exercises will guide readers through the text. Part II provides an extensive exposition on the nonlinear integral equations and their varied applications, presenting in an accessible manner a systematic treatment of the Fredholm problem for the Volterra-Fredholm problem—a problem that has not been treated in this manner before. This book is intended for scholars and researchers in the fields of physics, applied mathematics and engineering. It can also be used as a text for advanced undergraduate and graduate students in applied mathematics, science and engineering, and related fields.

Dr. Abdul-Majid Wazwaz is a Professor of Mathematics at Saint Xavier University in Chicago, Illinois, USA.

This unique volume is the first book on integral equation-based methods that combines quantitative formulas for predicting numerical simulation accuracy together with rigorous error estimates and results for dozens of actual electromagnetics and wave propagation problems. You get the latest insights on accuracy-improving methods like regularization and error-increasing effects such as edge singularities and resonance, along with full details on how to determine mesh density, choice of basis functions, and other parameters needed to optimize any numerical simulation.

This book provides an extensive introduction to the numerical solution of a large class of integral equations.
This book combines theory, applications, and numerical methods, and covers each of these fields with the same weight. In order to make the book accessible to mathematicians, physicists, and engineers alike, the author has made it self-contained as possible, requiring only a solid foundation in differential and integral calculus, complex analysis, and numerical analysis. The numerical solution of integral equations is developed within the book itself. Problems are included at the end of each chapter. For this third edition in order to make the basic functional analytic tools more complete the Hahn-Banach extension theorem and the Banach open mapping theorem are now included in the text. The treatment of boundary value problems in potential theory has been extended by a more complete discussion of integral equations of the first kind in the classical Holder space setting and of both integral equations of the first and second kind in the contemporary Sobolev space setting. In the numerical solution part of the book, the author included a new collocation method for two-dimensional hypersingular boundary integral equations and a collocation method for the three-dimensional Lippmann-Schwinger equation. The final chapter of the book on inverse boundary value problems for the Laplace equation has been largely rewritten with special attention to the trilogy of decomposition, iterative and sampling methods Reviews of earlier editions: "This book is an excellent introductory text for students, scientists, and engineers who want this field, such basic theory of linear integral equations and their numerical solution." (Math. Reviews, 2000) "This is a good introductory text book on linear integral equations. It contains almost all the topics necessary for a student. The presentation of the subject matter is lucid, clear and in the proper modern framework without being too abstract." (ZbMath, 1999)

From the reviews of the First Edition: "Extremely clear, self-contained text … offers to a wide class of readers the theoretical foundations and the modern numerical methods of the theory of linear integral equations." -Revue Roumaine de Mathematiques Pures et Appliquees. Abdul Jerri has revised his highly applied book to make it even more useful for scientists and engineers, as well as mathematicians. Covering the fundamental ideas and techniques at a level accessible to anyone with a solid undergraduate background in calculus and differential equations, Dr. Jerri clearly demonstrates how to use integral equations to solve real-world engineering and physics problems. This edition provides precise guidelines to the basic methods of solutions, details more varied numerical methods, and substantially boosts the total of practical examples and exercises. Plus, it features added emphasis on the basic theorems for the existence and uniqueness of solutions of integral equations and points out the interrelation between differentiation and integration. Other features include: * A new section on integral equations in higher dimensions. * An improved presentation of the Laplace and Fourier transforms. * A new detailed section for Fredholm integral equations of the first kind. * A new chapter covering the basic higher quadrature numerical integration rules. * A concise introduction to linear and nonlinear integral equations. * Clear examples of singular integral equations and their solutions. * A student's solutions manual available directly from the author.

The computational power currently available means that practitioners can find extremely accurate approximations to the solutions of more and more sophisticated mathematical models-providing they know the right analytical techniques. In relatively simple terms, this book describes a class of techniques that fulfill this need by providing closed-form solutions to many boundary value problems that arise in science and engineering. Boundary integral equation methods (BIEM's) have certain advantages over other procedures for solving such problems: BIEM's are powerful, applicable to a wide variety of problems, elegant, and ideal for numerical treatment. Certain fundamental constructs in BIEM's are also essential ingredients in boundary element methods, often used by engineers. However, BIEM's are special sometimes more useful in plane cases than in their three-dimensional counterparts. Consequently, the full, detailed BIEM treatment of two-dimensional problems has been largely neglected in the literature-even when it is more than marginally different from that applied to the corresponding three-dimensional versions. This volume discusses three typical cases where such differences are clear: the Laplace equation (one unknown function), plane strain (two unknown functions), and the bending of plates with transverse shear deformation (three unknown functions). Each of these is treated in a thorough manner, with respect to the existence and uniqueness of regular solutions-through several BIEM's. He proposes suitable generalizations of the concept of logarithmic capacity for plane strain and bending of plates, then to identify contours where non-uniqueness may occur. In the final section, the author compares and contrasts the various solution representations, links them by means of boundary operators, and evaluates them for their suitability for Riemann/Hilbert problems are fundamental objects of study within complex analysis. Many problems in differential equations and integrable systems, probability and random matrix theory, and asymptotic analysis can be solved by reformulation as a Riemann/Hilbert problem. This book, the most comprehensive one to date on the applied and computational theory of Riemann/Hilbert problems, includes an introduction to computational complex analysis, an introduction to the applied theory of Riemann/Hilbert problems from an analytical and numerical perspective, and a discussion of applications to integrable systems. In Chapters 2, 4, and 5 more detailed treatment of the integral and differential equations, and functional theoretical is presented. It also includes fundamental concepts, examples and applications of the analytical and numerical Riemann/Hilbert method, each of mathematical or physical significance or both.

Methods of Numerical Integration, Second Edition describes the theoretical and practical aspects of major methods of numerical integration. Numerical integration is the study of how the numerical value of an integral can be found. This book contains six chapters and begins with a discussion of the basic principles and limitations of numerical integration. The succeeding chapters present the approximate integration rules and formulas over finite and infinite intervals. These topics are followed by a review of error analysis and estimation, as well as the application of functional analysis to numerical integration. A chapter describes approximate integration in two or more dimensions. The final chapter looks into the goals and processes of automatic integration, with particular attention to the application of Tschebyscheff polynomials. This book will be of great value to theoreticians and computer programmers. An introduction into numerical analysis for students in mathematics, physics, and engineering. Instead of attempting to exhaustively cover everything, the goal is to guide readers towards the basic ideas and general principles by way of the main and important numerical methods. The book includes the necessary basic functional analytic tools for the solid mathematical foundation of numerical analysis -- indispensable for any deeper study and understanding of numerical methods, for differential equations and integral equations. The text is presented in a concise and easily understandable fashion so as to be successfully mastered in a one-year course.

The theory of integral equations has been an active research field for many years and is based on analysis, function theory, and functional analysis. On the other hand, integral equations are of practical interest because of the «boundary integral equation method», which transforms partial differential equations on a domain into integral equations over its boundary. This book grew out of a series of lectures given by the author at the Ruhr-Universitat Bochum and the Christian-Albrecht-Universitat zu Kiel to students of mathematics. The contents of the first six chapters correspond to an intensive lecture course of four hours per week for a semester. Readers of the book require background from analysis and the foundations of numeri cal mathematics. Knowledge of functional analysis is helpful, but to begin with some basic facts about Banach and Hilbert spaces are sufficient. The theoretical part of this book is reduced to a minimum: in Chapters 2, 4, and 5 more detailed treatment of the integral and differential equations, and functional theoretical is presented. Important parts of functional analysis (e. g., the Riesz-Schauder theory) are presented without proof. We expect the reader either to be already familiar with functional analysis or to become motivated by the practical examples given here to read a book about this topic. We recall that also from a historical point of view, functional analysis was initially stimulated by the investigation of integral equations.

This book aims to introduce some new trends and results on the study of the fractional differential equations, and to provide a good understanding of this field to beginners who are interested in this field, which is the authors' beautiful hope. This book describes theoretical and numerical aspects of the fractional partial differential equations, including the authors' researches in this field as the fractional Nonlinear Schrödinger equations, fractional Landau-Lifschitz equations and fractional Ginzburg-Landau equations. It also covers enough fundamental knowledge on the fractional derivatives and fractional integrals, and
enough background of the fractional PDEs. Contents:Physics BackgroundFractional Calculus and Fractional Differential EquationsFractional Partial Differential EquationsNumerical Approximations in Fractional CalculusNumerical Methods for the Fractional Ordinary Differential EquationsNumerical Methods for Fractional Partial Differential Equations Readership: Graduate students and researchers in mathematical physics, numerical analysis and computational mathematics. Key Features:This book covers the fundamentals of this field, especially for the beginnersThe book covers new trends and results in this fieldThe book covers numerical results, which will be of broad interests to researchersKeywords:Fractional Partial Differential Equations;Numerical Solutions

Collocation based on piecewise polynomial approximation represents a powerful class of methods for the numerical solution of initial-value problems for functional differential and integral equations arising in a wide spectrum of applications, including biological and physical phenomena. The present book introduces the reader to the general principles underlying these methods and then describes in detail their convergence properties when applied to ordinary differential equations, functional equations with (Volterra type) memory terms, delay equations, and differential-algebraic and integral-algebraic equations. Each chapter starts with a self-contained introduction to the relevant theory of the class of equations under consideration. Numerous exercises and examples are included, along with extensive historical notes and bibliographical notes utilising the vast annotated reference list of over 1300 items. In sum, Hermann Brunner has written a treatise that can serve as an introduction for students, a guide for users, and a comprehensive resource for experts.

This textbook provides a readable account of techniques for numerical solutions.

An attractive book on the intersection of analysis and numerical analysis, deriving classical boundary integral equations arising from the potential theory and acoustics. This self-contained monograph can be used as a textbook by graduate/postgraduate students. It also contains a lot of carefully chosen exercises.

It is well known that the traditional failure criteria cannot adequately explain failures which occur at a nominal stress level considerably lower than the ultimate strength of the material. The current procedure for predicting the safe loads or safe useful life of a structural member has been evolved around the discipline of nonlinear fracture mechanics. This approach introduces the concept of a crack extension force which can be used to rank materials in some order of fracture resistance. The idea is to determine the largest crack that a material will tolerate without failure. Laboratory methods for characterizing the fracture toughness of many engineering materials are now available. While these test data are useful for providing some rough guidance in the choice of materials, it is not clear how they could be used in the design of a structure. The understanding of the relationship between laboratory tests and fracture design of structures is, to say the least, deficient. Fracture mechanics is presently at anastadstill until the basic problems of scaling from laboratory models to full size structures and mixed mode crack propagation are resolved. The answers to these questions require basic understanding of the theory and will not be found by testing more specimens. The current theory of fracture is inadequate for many reasons. First of all it can only treat idealized problems where the applied load must be directed normal to the crack plane.

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 textbook which demonstrates how to apply mathematics to solve engineering problems. It begins with an overview of engineering and introduces introduction to linear algebra, and a calculus chapter. The next chapter introduces 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 methods. 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.

This book presents and explains a general, efficient, and elegant method for solving the Dirichlet, Neumann, and Robin boundary value problems for the extensional deformation of a thin plate on an elastic foundation. The solutions of these problems are obtained analytically—by means of direct and indirect methods. The equation methods are separated into three chapters: linear algebra, and a calculus chapter. The next chapter introduces 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 methods. 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:

An concise introduction to numerical methodsand the mathematicalframework needed to understand their performance Numerical Solution of Ordinary Differential Equationspresents a complete and easy-to-follow introduction to classicaltopics in the numerical solution of ordinary differential equations. The book's approach not only explains the presented mathematics, but also helps readers understand how these numerical methods are used to solve real-world problems. Unifying perspectives are provided throughout the text, bringing together and categorizing different types of problems in order to help readers comprehend the applications of ordinary differential equations. In addition, the authors' collective academic experiences ensure a coherent and accessible discussion of key topics, including: Euler's method; Taylor and Runge-Kutta methods; General error analysis; 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 test their understanding of the presented methods, and a related Web site features MATLAB® programs that facilitate experimentation with numerical methods in greater depth. Detailed references outline additional literature on both analytical and numerical aspects of ordinary differential equations. For further exploration of individual topics, Numerical Solution of Ordinary Differential Equations is an excellent textbook for courses on the numerical solution of differential equations at the upper-undergraduate and beginning-graduate levels. It also serves as a valuable reference for researchers in the fields of mathematics and engineering. In addition to theory, this book focuses on practical application and computer implementation in a coherent introduction to boundary integrals, boundary element and singularity methods for steady and unsteady flow at zero Reynolds numbers.

This book is the most comprehensive, up-to-date account of the popular numerical methods for solving boundary value problems in ordinary differential equations. It aims at a thorough understanding of the field by giving an in-depth analysis of the numerical methods by using decoupling principles. Numerous exercises and real-world examples are used throughout to demonstrate the methods and the theory. Although first published in 1988, this republication remains the most comprehensive theoretical coverage of the subject matter, not available elsewhere in one volume. Many problems, arising in a wide variety of application areas, give rise to mathematical models which form boundary value problems for ordinary differential equations. These problems rarely have a closed form solution, and computer simulation is typically used to obtain their approximate solution. This book discusses methods to carry out such computer simulations: robust, efficient, and reliable manner.

The second edition of Linear Integral Equations continues the emphasis that the first edition placed on applications. Indeed, many more examples have been added throughout the text. Significant new material has been added in Chapters 6 and 8. For instance, in Chapter 8 we have included the solutions of the Cauchy type integral equations on the real line. Also, there is a section on integral equations with a logarithmic kernel. The bibliography at the end of the book has been extended and brought up to date. I wish to thank Professor B.K. Sachdeva who has checked the revised manuscript and suggested many improvements. Last but not least, I am grateful to the editor and staff of Birkhäuser for inviting me to prepare this new edition and for their support in preparing it for publication. Rami Kanwal CHAPTEItroduction 1.1. Definition An integral equation is an equation in which an unknown function appears under one or more integral signs. Naturally, in such an equation there can occur other terms as well. For example, for $a < -b$, $a t \leq b$, the equations (1.1.1)
f(s) = i b Ks, t(s) = t(s)dt, g(s) = f(s) + i b Ks, t(s)dt, (1.1.2) g(s) = i b Ks, t(s)dt, (1.1.3) where the function g(s) is the unknown function and all the other functions are known, are integral equations. These functions may be complex-valued functions of the real variables s and t.

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.

This book deals with the numerical solution of integral equations based on approximation of functions and the authors apply wavelet approximation to the unknown function of integral equations. The book's goal is to categorize the selected methods and assess their accuracy and efficiency.

Presents the state of the art in the study of fast multiscale methods for solving these equations based on wavelets.

In 1979, I edited Volume 18 in this series: Solution Methods for Integral Equations: Theory and Applications. Since that time, there has been an explosive growth in all aspects of the numerical solution of integral equations. By my estimate over 2000 papers on this subject have been published in the last decade, and more than 60 books on theory and applications have appeared. In particular, as can be seen in many of the chapters in this book, integral equation techniques are playing an increasingly important role in the solution of many scientific and engineering problems. For instance, the boundary element method discussed by Atkinson in Chapter 1 is becoming an equal partner with finite element and finite difference techniques for solving many types of partial differential equations. Obviously, in one volume it would be impossible to present a complete picture of what has taken place in this area during the past ten years. Consequently, we have chosen a number of subjects in which significant advances have been made that we feel have not been covered in depth in other books. For instance, ten years ago the theory of the numerical solution of Cauchy singular equations was in its infancy. Today, as shown by Golberg and Elliott in Chapters 5 and 6, the theory of polynomial approximations is essentially complete, although many details of practical implementation remain to be worked out.

Numerical Methods for Fractional Calculus presents numerical methods for fractional integrals and fractional derivatives, finite difference methods for fractional ordinary differential equations (FODEs) and fractional partial differential equations (FPDEs), and finite element methods for FPDEs. The book introduces the basic definitions and properties.

Presents an aspect of activity in integral equations methods for the solution of Volterra equations for those who need to solve real-world problems. Since there are few known analytical methods leading to closed-form solutions, the emphasis is on numerical techniques. The major points of the analytical methods used to study the properties of the solution are presented in the first part of the book. These techniques are important for gaining insight into the qualitative behavior of the solutions and for designing effective numerical methods. The second part of the book is devoted entirely to numerical methods. The author has chosen the simplest possible setting for the discussion, the space of real functions of real variables. The text is supplemented by examples and exercises.

In many scientific or engineering applications, where ordinary differential equation (ODE), partial differential equation (PDE), or integral equation (IE) models are involved, numerical simulation is in common use for prediction, monitoring, or control purposes. In many cases, however, successful simulation of a process must be preceded by the solution of the so-called inverse problem, which is usually more complex: given measured data and an associated theoretical model, determine unknown parameters in that model (or unknown functions to be parametrized) in such a way that some measure of the "discrepancy" between data and model is minimal. The present volume deals with the numerical treatment of such inverse problems in fields of application like chemistry (Chap. 2.3.4, 7.9), molecular biology (Chap. 22), physics (Chap. 8.11.20), geophysics (Chap. 10.19), astronomy (Chap. 5), reservoir simulation (Chap. 15.16), electrocardiology (Chap. 14), computer tomography (Chap. 21), and control system design (Chap. 12.13). In the actual computational solution of inverse problems in these fields, the following typical difficulties arise: (1) The evaluation of the sensitivity coefficients for the model, may be rather time and storage consuming. Nevertheless these coefficients are needed (a) to ensure (local) uniqueness of the solution, (b) to estimate the accuracy of the obtained approximation of the solution, (c) to speed up the iterative solution of nonlinear problems. (2) Often the inverse problems are ill-posed. To cope with this fact in the presence of noisy or incomplete data or inevitable discretization errors, regularization techniques are necessary.

Special functions arise in many problems of pure and applied mathematics, mathematical statistics, physics, and engineering. This book provides an up-to-date overview of numerical methods for computing special functions and discusses when to use these methods depending on the function and the range of parameters. Not only are standard and simple parameter domains considered, but methods valid for large and complex parameters are described as well. The first part of the book (basic methods) covers convergent and divergent series, Chebyshev expansions, numerical quadrature, and recurrence relations. Its focus is on the computation of special functions; however, it is suitable for general numerical courses. Pseudocode algorithms are given to help students write their own algorithms. In addition to these basic tools, the authors discuss other useful and efficient methods, such as methods for computing zeros of special functions, uniform asymptotic expansions, Padé approximations, and sequence transformations. The book also provides specific algorithms for computing several special functions (like Airy functions and parabolic cylinder functions, among others).

Copyright code: 1e65695232b54e96b9109b4a39cc6656

Page 4/4