Power Series Solutions To Linear Differential Equations

Computer Algebra in Scientific Computing
Differential Equations with Mathematica
Ordinary Differential Equations in the Complex Domain
Advanced Engineering Mathematics from Divergent Power Series to Analytic Functions
Engineering Mathematics: Partial Differential Equations
Student Solutions Manual for Zill/Wright's Differential Equations with Boundary-Value Problems, 9th
Generalized Power Series Solutions to Linear Partial Differential Equations
Student Solutions Manual for Zill/Wright's Differential Equations with Boundary-Value Problems, 9th
Generalized Power Series Solutions to Linear Partial Differential Equations
A First Course in Differential Equations with Modeling Applications
Some Efficient Methods for Obtaining Infinite Series Solutions of N-th Order Linear Ordinary Differential Equations
Notes on Diffr Qs
Computers in Mathematics
Multisummability of Formal Power Series Solutions of Linear Ordinary Differential Equations
Mathematical Analysis of Evolution, Information, and Complexity
The Art of Modeling in Science and Engineering with Mathematica, Second Edition
Differential Equations with Maple V
Differential Equations: Methods and Applications
Concurrent Algorithm for Power Series Solutions of a Class of Linear Ordinary Differential Equations
Methods of Applied Mathematics for Engineers and Scientists
Differential Equations Problem Solver
Handbook of Nonlinear Partial Differential Equations
The Convergence of Power Series Solutions to Second-order Linear Differential Equations
Differential Equations with Boundary-Value Problems
An Introduction to G-Functions, (AM-133), Volume 133
Differential Equations with Boundary-Value Problems
Formal Power Series and Linear Systems of Meromorphic Ordinary Differential Equations
Introduction to Ordinary Differential Equations
Essential Mathematics for the Physical Sciences, Volume 1
Differential Equations and Dynamical Systems
Elementary Differential Equations and Boundary Value Problems
An Introduction to G-functions
Ordinary Differential Equations and Mathematical Aspects of Nonlinear Dispersive Equations, 4th Edition
Essential Differential Equations
Advanced Engineering Mathematics - Book A lone Mathematical Aspects of Nonlinear Dispersive Equations (AM-163)
Elementary Differential Equations and Boundary Value Problems
An Introduction to Ordinary Differential Equations
Tb Of Ordinary Diff Eq.2E
Introduction to Ordinary Differential Equations, Second Edition
Furnishes an introduction to differential equations. This book presents the application and includes problems in chemistry, biology, economics, mechanics, and electric circuits. Organized into 12 chapters, this edition begins with an overview of the methods for solving single differential equations. This text then describes the important basic properties of solutions of linear differential equations and explains higher-order linear equations. Other chapters consider the possibility of representing the solutions of certain linear differential equations in terms of power series. This book discusses as well the important properties of the gamma function and explains the stability of solutions and the existence of periodic solutions. The final chapter deals with the mathematical construction of the solution of the integral equation and explains how to establish the existence of a solution of the initial value system. This book is a valuable resource for mathematicians, students, and research workers. Thoroughly Updated, Zill's Advanced Engineering Mathematics, Third Edition Is A Compendium Of Many Mathematical Topics
For Students Planning A Career In Engineering Or The Sciences.
Numerous New Projects Contributed By Esteemed Mathematicians Have Been Added. Key Features O The Entire Text Has Been Modernized To Prepare Engineers And Scientists With The Mathematical Skills Required To Meet Current Technological Challenges. O The New Larger Trim Size And 2-Color Design Make The Text A Pleasure To Read And Learn From. O Numerous NEW Engineering And Science Projects Contributed By Top Mathematicians Have Been Added, And Are Tied To Key Mathematical Topics In The Text. O Divided Into Five Major Parts, The Text's Flexibility Allows Instructors To Customize The Text To Fit Their Needs. The First Eight Chapters Are Ideal For A Complete Short Course In Ordinary Differential Equations. O The Gram-Schmidt Orthogonalization Process Has Been Added In Chapter 7 And Is Used In Subsequent Chapters. O All Figures Now Have Explanatory Captions. Supplements O Complete Instructor'S Solutions: Includes All Solutions To The Exercises Found In The Text. Powerpoint Lecture Slides And Additional Instructor'S Resources Are Available Online. O Student Solutions To A company A dvanced Engineering Mathematics, Third Edition: This Student Supplement Contains The A nswers To Every T hird Problem In The Textbook, Allowing Students To A ssess Their Progress A nd Review Key Ideas A nd Concepts Discussed Throughout The Text.
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Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version. This collection of new and original papers on mathematical aspects of nonlinear dispersive equations includes both expository and technical papers that reflect a number of recent advances in the field. The expository papers describe the state of the art and research directions. The technical papers concentrate on a specific problem and the related analysis and are addressed to active researchers. The book deals with many topics that have been the focus of intensive research and, in several cases, significant progress in recent years, including hyperbolic conservation laws, Schrödinger operators, nonlinear Schrödinger and wave equations, and the Euler and Navier-Stokes equations. The Handbook of Nonlinear Partial Differential Equations is the latest in a series of acclaimed handbooks by these authors and presents exact solutions of
more than 1600 nonlinear equations encountered in science and engineering--many more than any other book available. The equations include those of parabolic, hyperbolic, elliptic and other types, and the authors pay special attention to equations of general form that involve arbitrary functions. A supplement at the end of the book discusses the classical and new methods for constructing exact solutions to nonlinear equations. To accommodate different mathematical backgrounds, the authors avoid wherever possible the use of special terminology, outline some of the methods in a schematic, simplified manner, and arrange the equations in increasing order of complexity. Highlights of the Handbook: Through the use of numerous examples that illustrate how to solve important applications using Maple V, Release 2, this book provides readers with a solid, hands-on introduction to ordinary and partial differential equations. Includes complete coverage of constructing and numerically computing and approximating solutions to ordinary and partial equations. Physics is expressed in the language of mathematics; it is deeply ingrained in how physics is taught and how it's practiced. A study of the mathematics used in science is thus asound intellectual investment for training as scientists and engineers. This first volume of two is centered on methods of solving partial differential equations (PDEs) and the special functions introduced. Solving PDEs can't be done, however, outside of the context in which they apply to physical systems. The solutions to PDEs must confrom to boundary conditions, a set of additional constraints in space or time to be satisfied at the boundaries of the system, that small part of the universe under study. The first volume is devoted to homogeneous boundary-value problems (BVPs), homogeneous implying a system lacking a forcing function, or source function. The second volume takes up (in addition to other topics) inhomogeneous problems where, in addition to the intrinsic PDE governing a physical field, source functions are an essential part of the system. This text is based on a course offered at the Naval Postgraduate School (NPS) and while produced for NPS needs, it will serve other universities well. It is based on the assumption that it follows a math review course, and was designed to coincide with the second quarter of student study, which is dominated by BVPs but also requires an understanding of special functions and Fourier analysis. Multisummability is a method which, for certain formal power series with radius of convergence equal to zero, produces an analytic function having the formal series as its asymptotic expansion. This book presents the theory of multisummability, and as an application, contains a proof of the fact that all formal power series solutions of non-linear meromorphic ODE are multisummable. It will be of use to graduate students and researchers in mathematics and theoretical physics, and especially to those who encounter formal power series to (physical) equations with rapidly, but regularly, growing coefficients. This book provides a self-contained introduction to ordinary differential equations and dynamical systems suitable for beginning graduate students. The first part begins with some simple examples of explicitly solvable equations and a first glance at qualitative methods. Then the fundamental results concerning the initial value problem are proved: existence, uniqueness, extensibility, dependence on initial conditions. Furthermore, linear equations are considered, including the Floquet theorem, and some perturbation results. As somewhat independent topics, the Frobenius method for linear equations in the complex domain is established and Sturm-Liouville boundary value problems, including oscillation theory, are investigated. The second part introduces the concept of a dynamical system. The Poincare-Bendixon theorem is proved, and several examples of planar systems from classical mechanics, ecology, and electrical engineering are investigated. Moreover, attractors, Hamiltonian systems, the KAM theorem, and periodic solutions are discussed. Finally, stability is studied, including the stable manifold and the Hartman-Grobman theorem for both continuous and discrete systems. The third part introduces chaos, beginning with the basics for iterated interval maps and ending with the Smale-Birkhoff theorem and the Melnikov method for homoclinic orbits. The text contains almost three hundred exercises. Additionally, the use of mathematical software systems is incorporated throughout, showing how they can help in the study of differential equations. Though ordinary differential equations is taught as a core course to students in mathematics and applied mathematics, detailed coverage of the topics with sufficient examples is unique. Written by a mathematics professor and intended as a textbook for third- and fourth-year undergraduates, the five chapters of this publication give a precise account of higher order differential equations, power series solutions, special functions, existence and uniqueness of solutions, and systems of linear equations. Relevant motivation for different concepts in each chapter and discussion of theory and problems-without the omission of steps-sets Ordinary Differential Equations: A First Course apart from other texts on ODEs. Full of distinguishing examples and containing exercises at the end of each chapter, this lucid course book will promote self-study among students. Based on course notes from over twenty years of teaching engineering and physical sciences at Michigan Technological University, Tomas Co's engineering mathematics textbook is rich with examples, applications and exercises. Professor Co uses analytical approaches to solve smaller problems to provide mathematical insight and understanding, and numerical methods for large and complex problems. The book emphasizes applying matrices with strong attention to matrix structure and computational issues such as sparsity and efficiency. Chapters on vector calculus and integral theorems are used to build coordinate-free physical models with special emphasis on orthogonal co-ordinates. Chapters on ODEs and PDEs cover both analytical and numerical approaches. Topics on analytical solutions include similarity transform methods, direct formulas for series solutions, bifurcation analysis, Lagrange-Charpit formulas, shocks/rarefaction and others. Topics on numerical methods include stability analysis, DAEs, high-order finite-difference formulas, Delaunay meshes, and
others. MATLAB® implementations of the methods and concepts are fully integrated. Version 6.0. An introductory course on differential equations aimed at engineers. The book covers first order ODEs, higher order linear ODEs, systems of ODEs, Fourier series and PDEs, eigenvalue problems, the Laplace transform, and power series methods. It has a detailed appendix on linear algebra. The book was developed and used to teach Math 286/285 at the University of Illinois at Urbana-Champaign, and in the decade since, it has been used in many classrooms, ranging from small community colleges to large public research universities. See https://www.jirka.org/diffyqs/ for more information, updates, errata, and a list of classroom adoptions. Mathematics lays the basic foundation for engineering students to pursue their core subjects. In Engineering Mathematics-III, the topics have been dealt with in a style that is lucid and easy to understand, supported by illustrations that enable the student to assimilate the concepts effortlessly. Each chapter is replete with exercises to help the student gain a deep insight into the subject. The nuances of the subject have been brought out through more than 300 well-chosen, worked-out examples interspersed across the book. This book presents a variety of techniques for solving ordinary differential equations analytically and features a wealth of examples. Focusing on the modeling of real-world phenomena, it begins with a basic introduction to differential equations, followed by linear and nonlinear first order equations and a detailed treatment of the second order linear equations. After presenting solution methods for the Laplace transform and power series, it lastly presents systems of equations and offers an introduction to the stability theory. To help readers practice the theory covered, two types of exercises are provided: those that illustrate the general theory, and others designed to expand on the text material. Detailed solutions to all the exercises are included. The book is excellently suited for use as a textbook for an undergraduate class (of all disciplines) in ordinary differential equations. DIFFERENTIAL EQUATIONS WITH BOUNDARY-VALUE PROBLEMS, 8th Edition strikes a balance between the theoretical, qualitative, and quantitative approaches to the study of differential equations. This proven and accessible text speaks to beginning engineering and math students through a wealth of pedagogical aids, including an abundance of examples, explanations, Remarks boxes, definitions, and group projects. Written in a straightforward, readable, and helpful style, the book provides a thorough treatment of boundary-value problems and partial differential equations. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version. Partial Differential Equations presents a balanced and comprehensive introduction to the concepts and techniques required to solve problems containing unknown functions of multiple variables. While focusing on the three most classical partial differential equations (PDEs)—the wave, heat, and Laplace equations—this detailed text also presents a broad practical perspective that merges mathematical concepts with real-world application in diverse areas including molecular structure, photon and electron interactions, radiation of electromagnetic waves, vibrations of a solid, and many more. Rigorous pedagogical tools aid in student comprehension; advanced topics are introduced frequently, with minimal technical jargon, and a wealth of exercises reinforce vital skills and invite additional self-study. Topics are presented in a logical progression, with major concepts such as wave propagation, heat and diffusion, electrostatics, and quantum mechanics placed in contexts familiar to students of various fields in science and engineering. By understanding the properties and applications of PDEs, students will be equipped to better analyze and interpret central processes of the natural world. This book constitutes the proceedings of the 19th International Workshop on Computer Algebra in Scientific Computing, CASC 2017, held in Beijing, China, in September 2017. The 28 full papers presented in this volume were carefully reviewed and selected from 33 submissions. They deal with cutting-edge research in all major disciplines of Computer Algebra. Talks from the International Conference on Computers and Mathematics held July 29-Aug. 1, 1986, Stanford U. Some are focused on the past and future roles of computers as a research tool in such areas as number theory, analysis, special functions, combinatorics, algebraic geometry, topology, physics. The use of the theta-operator method and generalized hypergeometric functions in obtaining solutions to nth-order linear ordinary differential equations is explained. For completeness, the analysis of the differential equation to determine whether the point of expansion is an ordinary point or a regular singular point is included. The superiority of the two methods shown over the standard method is demonstrated by using all three of the methods to work out several examples. Also included is a compendium of formulae and properties of the theta operator and generalized hypergeometric functions which is complete enough to make the report self-contained. Thoroughly revised and updated, The Art of Modeling in Science and Engineering with Mathematica®, Second Edition explores the mathematical tools and procedures used in modeling based on the laws of conservation of mass, energy, momentum, and electrical charge. The authors have culled and consolidated the best from the first edition and expanded the range of applied examples to reach a wider audience. The text proceeds, in measured steps, from simple models of real-world problems at the algebraic and ordinary differential equations (ODE) levels to more sophisticated models requiring partial differential equations. The traditional solution methods are supplemented with Mathematica, which is used throughout the text to arrive at solutions for many of the problems presented. The text is enlivened with a host of illustrations and practice problems drawn from classical and contemporary sources. They range from Thomson’s famous experiment to determine e/m and Euler’s model for the buckling of a strut to an analysis of the propagation of emissions and the performance of wind turbines. The mathematical tools required are first explained in separate chapters and then carried along throughout the text to solve and analyze the models. Commentaries at the
end of each illustration draw attention to the pitfalls to be avoided and, perhaps most important, alert the reader to unexpected results that defy conventional wisdom. These features and more make the book the perfect tool for resolving three common difficulties: the proper choice of model, the absence of precise solutions, and the need to make suitable simplifying assumptions and approximations. The book covers a wide range of physical processes and phenomena drawn from various disciplines and clearly illuminates the link between the physical system being modeled and the mathematical expression that results. Now enhanced with the innovative DE Tools CD-ROM and the ILrn teaching and learning system, this proven text explains the "how" behind the material and strikes a balance between the analytical, qualitative, and quantitative approaches of the study of differential equations. This accessible text speaks to students through a wealth of pedagogical aids, including an abundance of examples, explanations, "Remarks" boxes, definitions, and group projects. This book was written with the student's understanding firmly in mind. Using a straightforward, readable, and helpful style, this book provides a thorough treatment of boundary-value problems and partial differential equations. Mathematics is an essential ingredient in the education of a student of mathematics or physics of a professional physicist, indeed in the education of any professional scientist or engineer. The purpose of Mathematical Physics is to provide a comprehensive study of the mathematics underlying theoretical physics at the level of graduate and postgraduate students and also have enough depth for others interested in higher level mathematics relevant to specialized fields. It is also intended to serve the research scientist or engineer who needs a quick refresher course in the subject. The Fourth Edition of the book has been thoroughly revised and updated keeping in mind the requirements of students and the latest UGC syllabus. Graduate-level text offers full treatments of existence theorems, representation of solutions by series, theory of majorants, dominants and minorants, questions of growth, much more. Includes 675 exercises. Bibliography. Written for advanced undergraduate and first-year graduate students, this book aims to introduce students to a serious level of p-adic analysis with important implications for number theory. The main object is the study of G-series, that is, power series y=aij=0 Ajxj with coefficients in an algebraic number field K. These series satisfy a linear differential equation Ly=0 with LIK(x) [d/dx] and have non-zero radii of convergence for each imbedding of K into the complex numbers. They have the further property that the common denominators of the first s coefficients go to infinity geometrically with the index s. After presenting a review of valuation theory and elementary p-adic analysis together with an application to the congruence zeta function, this book offers a detailed study of the p-adic properties of formal power series solutions of linear differential equations. In particular, the p-adic radii of convergence and the p-adic growth of coefficients are studied. Recent work of Christol, Bombieri, André, and Dwork is treated and augmented. The book concludes with Chudnovsky's theorem: the analytic continuation of a G-series is again a G-series. This book will be indispensable for those wishing to study the work of Bombieri and André on global relations and for the study of the arithmetic properties of solutions of ordinary differential equations. Elementary Differential Equations and Boundary Value Problems 11e, like its predecessors, is written from the viewpoint of the applied mathematician, whose interest in differential equations may sometimes be quite theoretical, sometimes intensely practical, and often somewhere in between. The authors have sought to combine a sound and accurate (but not abstract) exposition of the elementary theory of differential equations with considerable material on methods of solution analysis, and approximation that have proved useful in a wide variety of applications. While the general structure of the book remains unchanged, some notable changes have been made to improve the clarity and readability of basic material about differential equations and their applications. In addition to expanded explanations, the 11th edition includes new problems, updated figures and examples to help motivate students. The program is primarily intended for undergraduate students of mathematics, science, or engineering, who typically take a course on differential equations during their first or second year of study. The main prerequisite for engaging with the program is a working knowledge of calculus, gained from a normal two- or three- semester course sequence or its equivalent. Some familiarity with matrices will also be helpful in the chapters on systems of differential equations. Each Problem Solver is an insightful and essential study and solution guide chock-full of clear, concise problem-solving gems. All your questions can be found in one convenient source from one of the most trusted names in reference solution guides. More useful, more practical, and more informative, these study aids are the best review books and textbook companions available. Nothing remotely as comprehensive or as helpful exists in their subject anywhere. Perfect for undergraduate and graduate studies. Here in this highly useful reference is the finest overview of differential equations currently available, with hundreds of differential equations problems that cover everything from integrating factors and Bernoulli's equation to variation of parameters and undetermined coefficients. Each problem is clearly solved with step-by-step detailed solutions. DETAILS - The PROBLEM SOLVERS are unique - the ultimate in study guides. - They are ideal for helping students cope with the toughest subjects. - They greatly simplify study and learning tasks. - They enable students to come to grips with difficult problems by showing them the way, step-by-step, toward solving problems. As a result, they save hours of frustration and time spent on groping for answers and understanding. - They cover material ranging from the elementary to the advanced in each subject. - They work exceptionally well with any text in its field. - PROBLEM SOLVERS are available in 41 subjects. - Each PROBLEM SOLVER is prepared by supremely knowledgeable experts. - Most are over 1000 pages. - PROBLEM SOLVERS are not meant to be read cover to cover. They offer whatever may be needed at
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André, and Dwork is treated and augmented. The book concludes with Chudnovsky's theorem: the analytic continuation of a G-series is again a G-series. This book will be indispensable for those wishing to study the work of Bombieri and André on global relations and for the study of the arithmetic properties of solutions of ordinary differential equations. A thorough, systematic first course in elementary differential equations for undergraduates in mathematics and science, requiring only basic calculus for a background. Includes many exercises and problems, with answers. Index. A FIRST COURSE IN DIFFERENTIAL EQUATIONS WITH MODELING APPLICATIONS, 10th Edition strikes a balance between the analytical, qualitative, and quantitative approaches to the study of differential equations. This proven and accessible text speaks to beginning engineering and math students through a wealth of pedagogical aids, including an abundance of examples, explanations, Remarks boxes, definitions, and group projects. Written in a straightforward, readable, and helpful style, this book provides a thorough treatment of boundary-value problems and partial differential equations. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version. Mathematical Analysis of Evolution, Information, and Complexity deals with the analysis of evolution, information and complexity. The time evolution of systems or processes is a central question in science, this text covers a broad range of problems including diffusion processes, neuronal networks, quantum theory and cosmology. Bringing together a wide collection of research in mathematics, information theory, physics and other scientific and technical areas, this new title offers elementary and thus easily accessible introductions to the various fields of research addressed in the book. Modern and comprehensive, the new Fifth Edition of Zill's Advanced Engineering Mathematics, Fifth Edition provides an in depth overview of the many mathematical topics required for students planning a career in engineering or the sciences. A key strength of this best-selling text is Zill's emphasis on differential equations as mathematical models, discussing the constructs and pitfalls of each. The Fifth Edition is a full compendium of topics that are most often covered in the Engineering Mathematics course or courses, and is extremely flexible, to meet the unique needs of various course offerings ranging from ordinary differential equations to vector calculus. The new edition offers a reorganized project section to add clarity to course material and new content has been added throughout, including new discussions on: Autonomous Des and Direction Fields; Translation Property, Bessel Functions, LU-Factorization, Da V inci's apparatus for determining speed and more. New and Key Features of the Fifth Edition: - A vailable with WebAssign with full integrated eBook - Two new chapters, Probability and Statistics, are available online - Updated example throughout - Projects, formerly found at the beginning of the text, are now included within the appropriate chapters. - New and updated content throughout including new discussions on: Autonomous Des and Direction Fields; Translation Property, Bessel Functions, LU-Factorization, Da V inci's apparatus for determining speed and more. - The Student Companion Website, included with every new copy, includes a wealth of study aids, learning tools, projects, and essays to enhance student learning Instructor materials include: complete instructor solutions manual, PowerPoint Image Bank, and Test Bank. Homework help! Worked-out solutions to select problems in the text.Simple Ordinary Differential Equations may have solutions in terms of power series whose coefficients grow at such a rate that the series has a radius of convergence equal to zero. In fact, every linear meromorphic system has a formal solution of a certain form, which can be relatively easily computed, but which generally involves such power series diverging everywhere. In this book the author presents the classical theory of meromorphic systems of ODE in the new light shed upon it by the recent achievements in the theory of summability of formal power series. The second edition of this groundbreaking book integrates new applications from a variety of fields, especially biology, physics, and engineering. The new handbook is also completely compatible with Mathematica version 3.0 and is a perfect introduction for Mathematica beginners. The CD-ROM contains built-in commands that let the users solve problems directly using graphical solutions. Copyright code: 9d544c51ca7ae93ecc305c37ad0d1bdc