Transformation Methods For Partial Differential Equations

The Heat Equation
Partial Differential Equations
Numerical Methods for Ordinary Differential Equations
Transformation Methods for Nonlinear Partial Differential Equations
Beginning Partial Differential Equations
Partial Differential Equations For Scientists And Engineers
Equations in Mathematical Physics
Partial Differential Equations
An Informal Treatment for Students of Physics and Engineering
Select Ideas in Partial Differential Equations
A First Course in Partial Differential Equations
Algorithms for Scientists and Engineers
An Introduction to Nonlinear Partial Differential Equations
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Wavelet Methods for Solving Partial Differential Equations and Fractional Differential Equations
A Course of Mathematics for Engineerings and Scientists
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Advanced Numerical and Semi-Analytical Methods for Differential Equations
Transforms and Partial Differential Equations(Combo)
Sustainable Process Engineering
Generating Spectral Methods Solvers for Partial Differential Equations
Ordinary and Partial Differential Equations
Transformation methods in the study of nonlinear partial differential equations
Mathematical and Analytical Techniques with Applications to Engineering

KOCH ALBERT

The Heat Equation World Scientific
The vital need for alternative resources and reaction routes, environmentally friendly and economically feasible industrial chemical processes has become a ubiquitous reality. This very timely introductory text covers new materials, processes and industry sectors: nanotechnology, microreactors, membrane separations, hybrid processes, clean technologies, energy savings and safe production of energy, renewables and biotechnology. Some completely new processes for the solid-liquid systems are also discussed in detail, thus creating new opportunities of sustainable development not only in industrial practice.
Partial Differential Equations Transform Methods for Solving Partial Differential Equations
Transforms and Partial Differential Equations, 6e is designed to provide a firm foundation on the basic concepts of partial differential equations, Fourier series analysis, Fourier series techniques in solving heat flow problems, Fourier transform techniques and Z-transforms. In their trademark student-friendly style, the authors have endeavored to provide an in-depth

understanding of the important principles, methods and processes of obtaining results in a systematic way with emphasis on clarity and academic rigor. Features: • More than 320 solved examples • More than 250 exercises with answers • More than 150 Part A questions with answers • Plenty of hints for problems • Includes a free book containing FAQs Table of Contents: Preface Acknowledgements About the Authors 1. Partial Differential Equations 2. Fourier Series 3. Application of Partial Differential Equations 4. Fourier Transforms 5. Z-transforms and Difference Equations Formulae To Remember

Numerical Methods for Ordinary Differential Equations John Wiley & Sons

This is the second edition of the now definitive text on partial differential equations (PDE). It offers a comprehensive survey of modern techniques in the theoretical study of PDE with particular emphasis on nonlinear equations. Its wide scope and clear exposition make it a great text for a graduate course in PDE. For this edition, the author has made numerous changes, including a new chapter on nonlinear wave equations, more than 80 new exercises, several new sections, a significantly expanded bibliography. About the First Edition: I have used this book for both regular PDE and topics courses. It has a wonderful combination of insight and technical detail. ... Evans' book is evidence of his mastering of the field and the clarity of presentation. --Luis Caffarelli, University of Texas It is fun to teach from Evans' book. It explains many of the essential ideas and techniques of partial differential equations ... Every graduate student in analysis should read it. --David Jerison, MIT I use Partial Differential Equations to prepare my students for their Topic exam, which is a requirement before starting working on their dissertation. The book provides an excellent account of PDE's ... I am very happy with the preparation it provides my students. --Carlos Kenig, University of Chicago Evans' book has already attained the status of a classic. It is a clear choice for students just learning the subject, as well as for experts who wish to broaden their knowledge ... An outstanding reference for many aspects of the field. --Rafe Mazzeo, Stanford University

Transformation Methods for Nonlinear Partial Differential Equations John Wiley & Sons

Transform Methods for Solving Partial Differential EquationsCRC Press

Beginning Partial Differential Equations Academic Press

This new book updates the exceptionally popular Numerical Analysis of Ordinary Differential Equations. "This book is...an indispensible reference for any researcher."-American Mathematical Society on the First Edition. Features: * New exercises included in each chapter. * Author is widely regarded as the world expert on Runge-Kutta methods * Didactic aspects of the book have been enhanced by interspersing the text with exercises. * Updated Bibliography.

Partial Differential Equations For Scientists And Engineers Cambridge University Press

The Heat Equation

Equations in Mathematical Physics Springer Science & Business Media

A Course of Mathematics for Engineers and Scientists, Volume 5 presents the solutions of differential equations by obtaining the results in different forms. This book discusses the significant

branch of mathematics generalizing the elementary ideas of function, integration, and differentiation. Organized into four chapters, this volume begins with an overview of the use of Fourier series that leads to solutions consisting of infinite series. This text then discusses the fundamental advantage of Laplace and Fourier transformation. Other chapters consider the technique of obtaining the solutions of ordinary, and several partial, differential equations from definite integrals. This book discusses as well the mathematical basis underlying the transformation methods connecting Laplace and Fourier transformations, which is given by the advancement of complex variable theory. The final chapter deals with the series of devices for inverting the transformation functions. This book is a valuable resource for scientists, engineers, mathematicians, and undergraduate students.

Partial Differential Equations John Wiley & Sons

This is an acessible book on the advanced symmetry methods for differential equations, including such subjects as conservation laws, Lie-Bäcklund symmetries, contact transformations, adjoint symmetries, Nöther's Theorem, mappings with some modification, potential symmetries, nonlocal symmetries, nonlocal mappings, and non-classical method. Of use to graduate students and researchers in mathematics and physics.

An Informal Treatment for Students of Physics and Engineering CRC Press

Examines numerical and semi-analytical methods for differential equations that can be used for solving practical ODEs and PDEs This student-friendly book deals with various approaches for solving differential equations numerically or semi-analytically depending on the type of equations and offers simple example problems to help readers along. Featuring both traditional and recent methods, Advanced Numerical and Semi Analytical Methods for Differential Equations begins with a review of basic numerical methods. It then looks at Laplace, Fourier, and weighted residual methods for solving differential equations. A new challenging method of Boundary Characteristics Orthogonal Polynomials (BCOPs) is introduced next. The book then discusses Finite Difference Method (FDM), Finite Element Method (FEM), Finite Volume Method (FVM), and Boundary Element Method (BEM). Following that, analytical/semi analytic methods like Akbari Ganji's Method (AGM) and Exp-function are used to solve nonlinear differential equations. Nonlinear differential equations using semi-analytical methods are also addressed, namely Adomian Decomposition Method (ADM), Homotopy Perturbation Method (HPM), Variational Iteration Method (VIM), and Homotopy Analysis Method (HAM). Other topics covered include: emerging areas of research related to the solution of differential equations based on differential quadrature and wavelet approach; combined and hybrid methods for solving differential equations; as well as an overview of fractal differential equations. Further, uncertainty in term of intervals and fuzzy numbers have also been included, along with the interval finite element method. This book: Discusses various methods for solving linear and nonlinear ODEs and PDEs Covers basic numerical techniques for solving differential equations along with various discretization methods Investigates nonlinear differential equations using semi-analytical methods Examines differential equations in an uncertain environment Includes a new scenario in which uncertainty (in

term of intervals and fuzzy numbers) has been included in differential equations Contains solved example problems, as well as some unsolved problems for self-validation of the topics covered Advanced Numerical and Semi Analytical Methods for Differential Equations is an excellent text for graduate as well as post graduate students and researchers studying various methods for solving differential equations, numerically and semi-analytically.

Select Ideas in Partial Differential Equations PHI Learning Pvt. Ltd.

The emphasis of the book is given in how to construct different types of solutions (exact, approximate analytical, numerical, graphical) of numerous nonlinear PDEs correctly, easily, and quickly. The reader can learn a wide variety of techniques and solve numerous nonlinear PDEs included and many other differential equations, simplifying and transforming the equations and solutions, arbitrary functions and parameters, presented in the book). Numerous comparisons and relationships between various types of solutions, different methods and approaches are provided, the results obtained in Maple and Mathematica, facilitates a deeper understanding of the subject. Among a big number of CAS, we choose the two systems, Maple and Mathematica, that are used worldwide by students, research mathematicians, scientists, and engineers. As in the our previous books, we propose the idea to use in parallel both systems, Maple and Mathematica, since in many research problems frequently it is required to compare independent results obtained by using different computer algebra systems, Maple and/or Mathematica, at all stages of the solution process. One of the main points (related to CAS) is based on the implementation of a whole solution method (e.g. starting from an analytical derivation of exact governing equations, constructing discretizations and analytical formulas of a numerical method, performing numerical procedure, obtaining various visualizations, and comparing the numerical solution obtained with other types of solutions considered in the book, e.g. with asymptotic solution).

A First Course in Partial Differential Equations Springer Science & Business Media

Differential Transformation Method for Mechanical Engineering Problems focuses on applying DTM to a range of mechanical engineering applications. The authors modify traditional DTM to produce two additional methods, multi-step differential transformation method (Ms-DTM) and the hybrid differential transformation method and finite difference method (Hybrid DTM-FDM). It is then demonstrated how these can be a suitable series solution for engineering and physical problems, such as the motion of a spherical particle, nanofluid flow and heat transfer, and micropolar fluid flow and heat transfer. Presents the differential transformation method and why it holds an advantage over higher-order Taylor series methods Includes a full mathematical introduction to DTM, Ms-DTM, and Hybrid DTM Covers the use of these methods for solving a range of problems in areas such as nanofluid flow, heat transfer, and motion of a spherical particle in different conditions Provides numerous examples and exercises which will help the reader fully grasp the practical applications of these new methods

Algorithms for Scientists and Engineers CRC Press

Many physical processes in fields such as mechanics, thermodynamics, electricity, magnetism or optics are described

by means of partial differential equations. The aim of the present book is to demontstrate the basic methods for solving the classical linear problems in mathematical physics of elliptic, parabolic and hyperbolic type. In particular, the methods of conformal mappings, Fourier analysis and Green`s functions are considered, as well as the perturbation method and integral transformation method, among others. Every chapter contains concrete examples with a detailed analysis of their solution.The book is intended as a textbook for students in mathematical physics, but will also serve as a handbook for scientists and engineers.

An Introduction to Nonlinear Partial Differential Equations World Scientific

Student Solutions Manual, Partial Differential Equations & Boundary Value Problems with Maple

Mathematical Methods in Chemical Engineering Springer Science & Business Media

The object of this work is to obtain the similarity solution of a given problem by applying the Group and Potential similarity transformation methods where the governing partial differential equations are written in a conserved form to obtain new simpler system of partial differential equations. We then applied the group method which reduces the new system with the auxiliary condition to a system of ordinary differential equation with the appropriate corresponding conditions that can be solved analytically or numerically. Because of the absence of this combination between the potential and the group methods so far, this search is considered as an innovation in the field of mathematics

Implementing Spectral Methods for Partial Differential Equations Academic Press

Suitable for advanced undergraduate and graduate students, this text presents the general properties of partial differential equations, including the elementary theory of complex variables. Solutions. 1965 edition.

Partial Differential Equations & Boundary Value Problems with Maple V Springer Science & Business Media

Incorporating a number of enhancements, Solution Techniques for Elementary Partial Differential Equations, Second Edition presents some of the most important and widely used methods for solving partial differential equations (PDEs). The techniques covered include separation of variables, method of characteristics, eigenfunction expansion, Fourier and Laplace transformations, Green’s functions, perturbation methods, and asymptotic analysis. New to the Second Edition New sections on Cauchy–Euler equations, Bessel functions, Legendre polynomials, and spherical harmonics A new chapter on complex variable methods and systems of PDEs Additional mathematical models based on PDEs Examples that show how the methods of separation of variables and eigenfunction expansion work for equations other than heat, wave, and Laplace Supplementary applications of Fourier transformations The application of the method of characteristics to more general hyperbolic equations Expanded tables of Fourier and Laplace transforms in the appendix Many more examples and nearly four times as many exercises This edition continues to provide a streamlined, direct approach to developing students’ competence in solving PDEs. It offers concise, easily understood explanations and worked

examples that enable students to see the techniques in action. Available for qualifying instructors, the accompanying solutions manual includes full solutions to the exercises. Instructors can obtain a set of template questions for test/exam papers as well as computer-linked projector files directly from the author.

A practical course Academic Press

An Introduction to Nonlinear Partial Differential Equations is a textbook on nonlinear partial differential equations. It is technique oriented with an emphasis on applications and is designed to build a foundation for studying advanced treatises in the field. The Second Edition features an updated bibliography as well as an increase in the number of exercises. All software references have been updated with the latest version of MATLAB@, the corresponding graphics have also been updated using MATLAB@. An increased focus on hydrogeology...

Advances in Computer Methods for Partial Differential Equations Springer Science & Business Media

The purpose of the book is to provide research workers in applied mathematics, physics, and engineering with practical geometric methods for solving systems of nonlinear partial differential equations. The first two chapters provide an introduction to the more or less classical results of Lie dealing with symmetries and similarity solutions. The results, however, are presented in the context of contact manifolds rather than the usual jet bundle formulation and provide a number of new conclusions. The remaining three chapters present essentially new methods of solution that are based on recent publications of the authors'. The text contains numerous fully worked examples so that the reader can fully appreciate the power and scope of the new methods. In effect, the problem of solving systems of nonlinear partial differential equations is reduced to the problem of solving families of autonomous ordinary differential equations. This allows the graphs of solutions of the system of partial differential equations to be realized as certain leaves of a foliation of an appropriately defined contact manifold. In fact, it is often possible to obtain families of solutions whose graphs foliate an open subset of the contact manifold. These ideas are extended in the final chapter by developing the theory of transformations that map a foliation of a contact manifold onto a foliation. This analysis gives rise to results of surprising depth and practical significance. In particular, an extended Hamilton-Jacobi method for solving systems of partial differential equations is obtained.

Mathematical Methods for the Physical Sciences CRC Press

A broad introduction to PDEs with an emphasis on specializedtopics and applications occurring in a variety of fields Featuring a thoroughly revised presentation of topics,Beginning Partial Differential Equations, Third Editionprovides a challenging, yet accessible, combination of techniques,applications, and introductory theory on the subjectof partialdifferential equations. The new edition offers nonstandardcoverageon material including Burger’s equation, thetelegraph equation, damped wavemotion, and the use ofcharacteristics to solve nonhomogeneous problems. The Third Edition is organized around four themes:methods of solution for initial-boundary value problems;applications of partial differential equations; existence andproperties of solutions; and the use of software to experiment withgraphics and carry out computations. With a primary focus on waveand diffusion processes, Beginning Partial

DifferentialEquations, Third Edition also includes: Proofs of theorems incorporated within the topicalpresentation, such as the existence of a solution for the Dirichletproblem The incorporation of Maple™ to perform computations andexperiments Unusual applications, such as Poe’s pendulum Advanced topical coverage of special functions, such as Bessel,Legendre polynomials, and spherical harmonics Fourier and Laplace transform techniques to solve importantproblems Beginning of Partial Differential Equations, ThirdEdition is an ideal textbook for upper-undergraduate andfirst-year graduate-level courses in analysis and appliedmathematics, science, and engineering.

Applied Engineering Analysis CRC Press

The main focus of the book is to implement wavelet based transform methods for solving problems of fractional order partial differential equations arising in modelling real physical phenomena. It explores analytical and numerical approximate solution obtained by wavelet methods for both classical and fractional order partial differential equations.

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