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KEY=HANDBOOK - YATES JIMENA

HANDBOOK OF LINEAR PARTIAL DIFFERENTIAL EQUATIONS FOR ENGINEERS AND SCIENTISTS

CRC Press Following in the footsteps of the authors' bestselling Handbook of Integral Equations and Handbook of Exact Solutions for Ordinary Differential Equations, this handbook presents brief formulations and exact solutions for more than 2,200 equations and problems in science and engineering. Parabolic, hyperbolic, and elliptic equations with

HANDBOOK OF LINEAR PARTIAL DIFFERENTIAL EQUATIONS FOR ENGINEERS AND SCIENTISTS

HANDBOOK OF NONLINEAR PARTIAL DIFFERENTIAL EQUATIONS

CRC Press 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:

HANDBOOK OF EXACT SOLUTIONS FOR ORDINARY DIFFERENTIAL EQUATIONS

CRC Press Exact solutions of differential equations continue to play an important role in the understanding of many phenomena and processes throughout the natural sciences in that they can verify the correctness of or estimate errors in solutions reached by numerical, asymptotic, and approximate analytical methods. The new edition of this bestselling handbook now contains the exact solutions to more than 6200 ordinary differential equations. The authors have made significant enhancements to this edition, including: An introductory chapter that describes exact, asymptotic, and approximate analytical methods for solving ordinary differential equations The addition of solutions to more than 1200 nonlinear equations An improved format that allows for an expanded table of contents that makes locating equations of interest more quickly and easily Expansion of the supplement on special functions This handbook's focus on equations encountered in applications and on equations that appear simple but prove particularly difficult to integrate make it an indispensable addition to the arsenals of mathematicians, scientists, and engineers alike.

HANDBOOK OF DIFFERENTIAL EQUATIONS: STATIONARY PARTIAL DIFFERENTIAL EQUATIONS

Elsevier A collection of self contained, state-of-the-art surveys. The authors have made an effort to achieve readability for mathematicians and scientists from other fields, for this series of handbooks to be a new reference for research, learning and teaching. Partial differential equations represent one of the most rapidly developing topics in mathematics. This is due to their numerous applications in science and engineering on the one hand and to the challenge and beauty of associated mathematical problems on the other. Key features: - Self-contained volume in series covering one of the most rapid developing topics in mathematics. - 7 Chapters, enriched with numerous figures originating from numerical simulations. - Written by well known experts in the field. - Self-contained volume in series covering one of the most rapid developing topics in mathematics. - 7 Chapters, enriched with numerous figures originating from numerical simulations. - Written by well known experts in the field.

PARTIAL DIFFERENTIAL EQUATIONS

AN INTRODUCTION

John Wiley & Sons 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.

LINEAR PARTIAL DIFFERENTIAL EQUATIONS FOR SCIENTISTS AND ENGINEERS

Springer Science & Business Media This significantly expanded fourth edition is designed as an introduction to the theory and applications of linear PDEs. The authors provide fundamental concepts, underlying principles, a wide range of applications, and various methods of solutions to PDEs. In addition to essential standard material on the subject, the book contains new material that is not usually covered in similar texts and reference books. It also contains a large number of worked examples and exercises dealing with problems in fluid mechanics, gas dynamics, optics, plasma physics, elasticity, biology, and chemistry; solutions are provided.

THE HANDBOOK OF INTEGRATION

CRC Press This book is a compilation of the most important and widely applicable methods for evaluating and approximating integrals. It is an indispensable time saver for engineers and scientists needing to evaluate integrals in their work. From the table of contents: - Applications of Integration - Concepts and Definitions - Exact Analytical Methods - Approximate Analytical Methods - Numerical Methods: Concepts - Numerical Methods: Techniques

HANDBOOK OF DIFFERENTIAL EQUATIONS

Gulf Professional Publishing This book and CD-ROM compile the most widely applicable methods for solving and approximating differential equations. The CD-ROM provides convenient access to these methods through electronic search capabilities, and together the book and CD-ROM contain numerous examples showing the methods use. Topics include ordinary differential equations, symplectic integration of differential equations, and the use of wavelets when numerically solving differential equations. * For nearly every technique, the book and CD-ROM provide: * The types of equations to which the method is applicable * The idea behind the method * The procedure for carrying out the method * At least one simple example of the method * Any cautions that should be exercised * Notes for more advanced users * References to the literature for more discussion or more examples, including pointers to electronic resources, such as URLs

HANDBOOK OF MATHEMATICS FOR ENGINEERS AND SCIENTISTS

CRC Press The Handbook of Mathematics for Engineers and Scientists covers the main fields of mathematics and focuses on the methods used for obtaining solutions of various classes of mathematical equations that underlie the mathematical modeling of numerous phenomena and processes in science and technology. To accommodate different mathematical backgrounds, the preeminent authors outline the material in a simplified, schematic manner, avoiding special terminology wherever possible. Organized in ascending order of complexity, the material is divided into two parts. The first part is a coherent survey of the most important definitions, formulas, equations, methods, and theorems. It covers arithmetic, elementary and analytic geometry, algebra, differential and integral calculus, special functions, calculus of variations, and probability theory. Numerous specific examples clarify the methods for solving problems and equations. The second part provides many in-depth mathematical tables, including those of exact solutions of various types of equations. This concise, comprehensive compendium of mathematical definitions, formulas, and theorems provides the foundation for exploring scientific and technological phenomena.

HANDBOOK OF DIFFERENTIAL EQUATIONS

Academic Press Handbook of Differential Equations is a handy reference to many popular techniques for solving and approximating differential equations, including exact analytical methods, approximate analytical methods, and numerical methods. Topics covered range from transformations and constant coefficient linear equations to finite and infinite intervals, along with conformal mappings and the perturbation method. Comprised of 180 chapters, this book begins with an introduction to transformations as well as general ideas about differential equations and how they are solved, together with the techniques needed to determine if a partial differential equation is well-posed or what the "natural" boundary conditions are. Subsequent sections focus on exact and approximate analytical solution techniques for differential equations, along with numerical methods for ordinary and partial differential equations. This monograph is intended for students taking courses in differential equations at either the undergraduate or graduate level, and should also be useful for practicing engineers or scientists who solve differential equations on an occasional basis.

HANDBOOK OF ORDINARY DIFFERENTIAL EQUATIONS

EXACT SOLUTIONS, METHODS, AND PROBLEMS

CRC Press The Handbook of Ordinary Differential Equations: Exact Solutions, Methods, and Problems, is an exceptional and complete reference for scientists and engineers as it contains over 7,000 ordinary differential equations with solutions. This book contains more equations and methods used in the field than any other book currently available. Included in the handbook are exact, asymptotic, approximate analytical, numerical symbolic and qualitative methods that are used for solving and analyzing linear and nonlinear equations. The authors also present formulas for effective construction of solutions and many different equations arising in various applications like heat transfer, elasticity, hydrodynamics and more. This extensive handbook is the perfect resource for engineers and scientists searching for an exhaustive reservoir of information on ordinary differential equations.

HANDBOOK OF LINEAR AND PARTIAL DIFFERENTIAL EQUATIONS

METHODS AND APPLICATIONS

The purpose of this book is to introduce the latest developments and techniques in the field. The goal is to provide an understandable working knowledge of the latest developments with a minimum of mathematical proofs.

LINEAR PARTIAL DIFFERENTIAL EQUATIONS FOR SCIENTISTS AND ENGINEERS

Birkhäuser This significantly expanded fourth edition is designed as an introduction to the theory and applications of linear PDEs. The authors provide fundamental concepts, underlying principles, a wide range of applications, and various methods of solutions to PDEs. In addition to essential standard material on the subject, the book contains new material that is not usually covered in similar texts and reference books. It also contains a large number of worked examples and exercises dealing with problems in fluid mechanics, gas dynamics, optics, plasma physics, elasticity, biology, and chemistry; solutions are provided.

MAPLE AND MATHEMATICA

A PROBLEM SOLVING APPROACH FOR MATHEMATICS

Springer Science & Business Media In the history of mathematics there are many situations in which calculations were performed incorrectly for important practical applications. Let us look at some examples, the history of computing the number π began in Egypt and Babylon about 2000 years BC, since then many mathematicians have calculated π (e. g. , Archimedes, Ptolemy, Viète, etc.). The first formula for computing decimal digits of π was discovered by J. Machin (in 1706), who was the first to correctly compute 100 digits of π . Then many people used his method, e. g. , W. Shanks calculated π with 707 digits (within 15 years), although due to mistakes only the first 527 were correct. For the next examples, we can mention the history of computing the fine-structure constant α (that was first discovered by A. Sommerfeld), and the mathematical tables, exact solutions, and formulas, published in many mathematical textbooks, were not verified rigorously [25]. These errors could have a large effect on results obtained by engineers. But sometimes, the solution of such problems required such technology that was not available at that time. In modern mathematics there exist computers that can perform various mathematical operations for which humans are incapable. Therefore the computers can be used to verify the results obtained by humans, to discover new results, to prove the result that a human can obtain without any technology. With respect to our example of computing π , we can mention that recently (in 2002) Y. Kanada, Y. Ushiro, H. Kuroda, and M.

HANDBOOK OF INTEGRAL EQUATIONS

SECOND EDITION

CRC Press Unparalleled in scope compared to the literature currently available, the Handbook of Integral Equations, Second Edition contains over 2,500 integral equations with solutions as well as analytical and numerical methods for solving linear and nonlinear equations. It explores Volterra, Fredholm, Wiener-Hopf, Hammerstein, Uryson, and other equations that arise in mathematics, physics, engineering, the sciences, and economics. With 300 additional pages, this edition covers much more material than its predecessor. New to the Second Edition • New material on Volterra, Fredholm, singular, hypersingular, dual, and nonlinear integral equations, integral transforms, and special functions • More than 400 new equations with exact solutions • New chapters on mixed multidimensional equations and methods of integral equations for ODEs and PDEs • Additional examples for illustrative purposes 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 material in increasing order of complexity. The book can be used as a database of test problems for numerical and approximate methods for solving linear and nonlinear integral equations.

GREEN'S FUNCTIONS AND LINEAR DIFFERENTIAL EQUATIONS

THEORY, APPLICATIONS, AND COMPUTATION

CRC Press Green's Functions and Linear Differential Equations: Theory, Applications, and Computation presents a variety of methods to solve linear ordinary differential equations (ODEs) and partial differential equations (PDEs). The text provides a sufficient theoretical basis to understand Green's function method, which is used to solve initial and boundary

INTRODUCTION TO PARTIAL DIFFERENTIAL EQUATIONS

Springer Science & Business Media This textbook is designed for a one year course covering the fundamentals of partial differential equations, geared towards advanced undergraduates and beginning graduate students in mathematics, science, engineering, and elsewhere. The exposition carefully balances solution techniques, mathematical rigor, and significant applications, all illustrated by numerous examples. Extensive exercise sets appear at the end of almost every subsection, and include straightforward computational problems to develop and reinforce new techniques and results, details on theoretical developments and proofs, challenging projects both computational and conceptual, and supplementary material that motivates the student to delve further into the subject. No previous experience with the subject of partial differential equations or Fourier theory is assumed, the main prerequisites being undergraduate calculus, both one- and multi-variable, ordinary differential equations, and basic linear algebra. While the classical topics of separation of variables, Fourier analysis, boundary value problems, Green's functions, and special functions continue to form the core of an introductory course, the inclusion of nonlinear equations, shock wave dynamics, symmetry and similarity, the Maximum Principle, financial models, dispersion and solutions, Huygens' Principle, quantum mechanical systems, and more make this text well attuned to recent developments and trends in this active field of contemporary research. Numerical approximation schemes are an important component of any introductory course, and the text covers the two most basic approaches: finite differences and finite elements.

EXACT SOLUTIONS AND INVARIANT SUBSPACES OF NONLINEAR PARTIAL DIFFERENTIAL EQUATIONS IN MECHANICS AND PHYSICS

CRC Press Exact Solutions and Invariant Subspaces of Nonlinear Partial Differential Equations in Mechanics and Physics is the first book to provide a systematic construction of exact solutions via linear invariant subspaces for nonlinear differential operators. Acting

as a guide to nonlinear evolution equations and models from physics and mechanics, the book focuses on the existence of new exact solutions on linear invariant subspaces for nonlinear operators and their crucial new properties. This practical reference deals with various partial differential equations (PDEs) and models that exhibit some common nonlinear invariant features. It begins with classical as well as more recent examples of solutions on invariant subspaces. In the remainder of the book, the authors develop several techniques for constructing exact solutions of various nonlinear PDEs, including reaction-diffusion and gas dynamics models, thin-film and Kuramoto-Sivashinsky equations, nonlinear dispersion (compacton) equations, KdV-type and Harry Dym models, quasilinear magma equations, and Green-Naghdi equations. Using exact solutions, they describe the evolution properties of blow-up or extinction phenomena, finite interface propagation, and the oscillatory, changing sign behavior of weak solutions near interfaces for nonlinear PDEs of various types and orders. The techniques surveyed in *Exact Solutions and Invariant Subspaces of Nonlinear Partial Differential Equations in Mechanics and Physics* serve as a preliminary introduction to the general theory of nonlinear evolution PDEs of different orders and types.

HANDBOOK OF MATHEMATICAL SCIENCE

CRC Press Numerical tables of mathematical and statistical functions are in continual demand by professional scientists, by those in the teaching profession, and by students of mathematics and related sciences. This handbook contains the most up-to-date, authoritative, logically arranged and readily usable collection of reference material available

HANDBOOK OF FIRST-ORDER PARTIAL DIFFERENTIAL EQUATIONS

CRC Press This book contains about 3000 first-order partial differential equations with solutions. New exact solutions to linear and nonlinear equations are included. The text pays special attention to equations of the general form, showing their dependence upon arbitrary functions. At the beginning of each section, basic solution methods for the corresponding types of differential equations are outlined and specific examples are considered. It presents equations and their applications, including differential geometry, nonlinear mechanics, gas dynamics, heat and mass transfer, wave theory and much more. This handbook is an essential reference source for researchers, engineers and students of applied mathematics, mechanics, control theory and the engineering sciences.

HANDBOOK OF LINEAR PARTIAL DIFFERENTIAL EQUATIONS FOR ENGINEERS AND SCIENTISTS

CRC Press Includes nearly 4,000 linear partial differential equations (PDEs) with solutions Presents solutions of numerous problems relevant to heat and mass transfer, wave theory, hydrodynamics, aerodynamics, elasticity, acoustics, electrodynamics, diffraction theory, quantum mechanics, chemical engineering sciences, electrical engineering, and other fields

SYMMETRY METHODS FOR DIFFERENTIAL EQUATIONS

A BEGINNER'S GUIDE

Cambridge University Press An introduction to symmetry methods, informally written and aimed at applied mathematicians, physicists, and engineers.

AN INTRODUCTION TO NONLINEAR PARTIAL DIFFERENTIAL EQUATIONS

John Wiley & Sons *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...

HANDBOOK OF NONLINEAR PARTIAL DIFFERENTIAL EQUATIONS, SECOND EDITION

CRC Press New to the Second Edition More than 1,000 pages with over 1,500 new first-, second-, third-, fourth-, and higher-order nonlinear equations with solutions Parabolic, hyperbolic, elliptic, and other systems of equations with solutions Some exact methods and transformations Symbolic and numerical methods for solving nonlinear PDEs with Maple™, Mathematica®, and MATLAB® Many new illustrative examples and tables A large list of references consisting of over 1,300 sources To accommodate different mathematical backgrounds, the authors avoid wherever possible the use of special terminology. They outline the methods in a schematic, simplified manner and arrange the material in increasing order of complexity.

A COMPENDIUM OF PARTIAL DIFFERENTIAL EQUATION MODELS

METHOD OF LINES ANALYSIS WITH MATLAB

Cambridge University Press Presents numerical methods and computer code in Matlab for the solution of ODEs and PDEs with detailed line-by-line discussion.

HANDBOOK OF DIFFERENTIAL EQUATIONS: STATIONARY PARTIAL DIFFERENTIAL EQUATIONS

Elsevier This handbook is the sixth and last volume in the series devoted to stationary partial differential equations. The topics covered by this volume include in particular domain perturbations for boundary value problems, singular solutions of semilinear elliptic problems, positive solutions to elliptic equations on unbounded domains, symmetry of solutions, stationary compressible Navier-Stokes equation, Lotka-Volterra systems with cross-diffusion, and fixed point theory for elliptic boundary value problems. * Collection of self-contained, state-of-the-art surveys * Written by well-known experts in the field * Informs and updates on all the latest developments

PARTIAL DIFFERENTIAL EQUATIONS FOR SCIENTISTS AND ENGINEERS

Courier Corporation Practical text shows how to formulate and solve partial differential equations. Coverage of diffusion-type problems, hyperbolic-type problems, elliptic-type problems, numerical and approximate methods. Solution guide available upon request. 1982 edition.

APPLICATIONS OF LIE'S THEORY OF ORDINARY AND PARTIAL DIFFERENTIAL EQUATIONS

CRC Press Lie's group theory of differential equations unifies the many ad hoc methods known for solving differential equations and provides powerful new ways to find solutions. The theory has applications to both ordinary and partial differential equations and is not restricted to linear equations. *Applications of Lie's Theory of Ordinary and Partial Differential Equations* provides a concise, simple introduction to the application of Lie's theory to the solution of differential equations. The author emphasizes clarity and immediacy of understanding rather than encyclopedic completeness, rigor, and generality. This enables readers to quickly grasp the essentials and start applying the methods to find solutions. The book includes worked examples and problems from a wide range of scientific and engineering fields.

PARTIAL DIFFERENTIAL EQUATIONS

American Mathematical Soc. 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

HANDBOOK OF SPLINES

Springer Science & Business Media The purpose of this book is to give a comprehensive introduction to the theory of spline functions, together with some applications to various fields, emphasizing the significance of the relationship between the general theory and its applications. At the same time, the goal of the book is also to provide new material on spline function theory, as well as a fresh look at old results, being written for people interested in research, as well as for those who are interested in applications. The theory of spline functions and their applications is a relatively recent field of applied mathematics. In the last 50 years, spline function theory has undergone a wonderful development with many new directions appearing during this time. This book has its origins in the wish to adequately describe this development from the notion of 'spline' introduced by I. J. Schoenberg (1901-1990) in 1946, to the newest recent theories of 'spline wavelets' or 'spline fractals'. Isolated facts about the functions now called 'splines' can be found in the papers of L. Euler, A. Lebesgue, G. Birkhoff, J.

DIFFERENTIAL EQUATIONS AND GROUP METHODS FOR SCIENTISTS AND ENGINEERS

CRC Press Differential Equations and Group Methods for Scientists and Engineers presents a basic introduction to the technically complex area of invariant one-parameter Lie group methods and their use in solving differential equations. The book features discussions on ordinary differential equations (first, second, and higher order) in addition to partial differential equations (linear and nonlinear). Each chapter contains worked examples with several problems at the end; answers to these problems and hints on how to solve them are found at the back of the book. Students and professionals in mathematics, science, and engineering will find this book indispensable for developing a fundamental understanding of how to use invariant one-parameter group methods to solve differential equations.

HALF-LINEAR DIFFERENTIAL EQUATIONS

Elsevier The book presents a systematic and compact treatment of the qualitative theory of half-linear differential equations. It contains the most updated and comprehensive material and represents the first attempt to present the results of the rapidly developing theory of half-linear differential equations in a unified form. The main topics covered by the book are oscillation and asymptotic theory and the theory of boundary value problems associated with half-linear equations, but the book also contains a treatment of related topics like PDE's with p-Laplacian, half-linear difference equations and various more general nonlinear differential equations. - The first complete treatment of the qualitative theory of half-linear differential equations. - Comparison of linear and half-linear theory. - Systematic approach to half-linear oscillation and asymptotic theory. - Comprehensive bibliography and index. - Useful as a reference book in the topic.

HANDBOOK OF DIFFERENTIAL EQUATIONS: EVOLUTIONARY EQUATIONS

Elsevier The material collected in this volume reflects the active present of this area of mathematics, ranging from the abstract theory of gradient flows to stochastic representations of non-linear parabolic PDE's. Articles will highlight the present as well as expected future directions of development of the field with particular emphasis on applications. The article by Ambrosio and Savaré discusses the most recent development in the theory of gradient flow of probability measures. After an introduction reviewing the properties of

the Wasserstein space and corresponding subdifferential calculus, applications are given to evolutionary partial differential equations. The contribution of Herrero provides a description of some mathematical approaches developed to account for quantitative as well as qualitative aspects of chemotaxis. Particular attention is paid to the limits of cell's capability to measure external cues on the one hand, and to provide an overall description of aggregation models for the slim mold *Dictyostelium discoideum* on the other. The chapter written by Masmoudi deals with a rather different topic - examples of singular limits in hydrodynamics. This is nowadays a well-studied issue given the amount of new results based on the development of the existence theory for rather general systems of equations in hydrodynamics. The paper by DeLellis addresses the most recent results for the transport equations with regard to possible applications in the theory of hyperbolic systems of conservation laws. Emphasis is put on the development of the theory in the case when the governing field is only a BV function. The chapter by Rein represents a comprehensive survey of results on the Poisson-Vlasov system in astrophysics. The question of global stability of steady states is addressed in detail. The contribution of Soner is devoted to different representations of non-linear parabolic equations in terms of Markov processes. After a brief introduction on the linear theory, a class of non-linear equations is investigated, with applications to stochastic control and differential games. The chapter written by Zuazua presents some of the recent progresses done on the problem of controllability of partial differential equations. The applications include the linear wave and heat equations, parabolic equations with coefficients of low regularity, and some fluid-structure interaction models. - Volume 1 focuses on the abstract theory of evolution - Volume 2 considers more concrete problems relating to specific applications - Volume 3 reflects the active present of this area of mathematics, ranging from the abstract theory of gradient flows to stochastic representations of non-linear PDEs

QUANTIZATION METHODS IN THE THEORY OF DIFFERENTIAL EQUATIONS

CRC Press This volume presents a systematic and mathematically rigorous exposition of methods for studying linear partial differential equations. It focuses on quantization of the corresponding objects (states, observables and canonical transformations) in the phase space. The quantization of all three types of classical objects is carried out in a unified way

HANDBOOK OF COMPUTATIONAL FLUID MECHANICS

Academic Press This handbook covers computational fluid dynamics from fundamentals to applications. This text provides a well documented critical survey of numerical methods for fluid mechanics, and gives a state-of-the-art description of computational fluid mechanics, considering numerical analysis, computer technology, and visualization tools. The chapters in this book are invaluable tools for reaching a deeper understanding of the problems associated with the calculation of fluid motion in various situations: inviscid and viscous, incompressible and compressible, steady and unsteady, laminar and turbulent flows, as well as simple and complex geometries. Each chapter includes a related bibliography. Covers fundamentals and applications. Provides a deeper understanding of the problems associated with the calculation of fluid motion

FINITE DIFFERENCE METHODS FOR ORDINARY AND PARTIAL DIFFERENTIAL EQUATIONS

STEADY-STATE AND TIME-DEPENDENT PROBLEMS

SIAM 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.

APPLIED STOCHASTIC DIFFERENTIAL EQUATIONS

Cambridge University Press Stochastic differential equations are differential equations whose solutions are stochastic processes. They exhibit appealing mathematical properties that are useful in modeling uncertainties and noisy phenomena in many disciplines. This book is motivated by applications of stochastic differential equations in target tracking and medical technology and, in particular, their use in methodologies such as filtering, smoothing, parameter estimation, and machine learning. It builds an intuitive hands-on understanding of what stochastic differential equations are all about, but also covers the essentials of It calculus, the central theorems in the field, and such approximation schemes as stochastic Runge-Kutta. Greater emphasis is given to solution methods than to analysis of theoretical properties of the equations. The book's practical approach assumes only prior understanding of ordinary differential equations. The numerous worked examples and end-of-chapter exercises include application-driven derivations and computational assignments. MATLAB/Octave source code is available for download, promoting hands-on work with the methods.

FUNCTIONAL ANALYSIS, SOBOLEV SPACES AND PARTIAL DIFFERENTIAL EQUATIONS

Springer Science & Business Media This textbook is a completely revised, updated, and expanded English edition of the important *Analyse fonctionnelle* (1983). In addition, it contains a wealth of problems and exercises (with solutions) to guide the reader. Uniquely, this book presents in a coherent, concise and unified way the main results from functional analysis together with the main results from the theory of partial differential equations (PDEs). Although there are many books on functional analysis and many on PDEs, this is the first to cover both of these closely connected topics. Since the French book was first published, it has been translated into Spanish, Italian, Japanese, Korean, Romanian, Greek and Chinese. The English edition makes a welcome addition to this list.

HANDBOOK OF DIFFERENTIAL EQUATIONS: STATIONARY PARTIAL DIFFERENTIAL EQUATIONS

Elsevier The book could be a good companion for any graduate student in partial differential equations or in applied mathematics. Each chapter brings indeed new ideas and new techniques which can be used in these fields. The different chapters can be read independently and are of great pedagogical value. The advanced researcher will find along the book the most recent achievements in

various fields. Independent chapters Most recent advances in each fields Hight didactic quality Self contained Excellence of the contributors Wide range of topics