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[The Theory of Equations: with an Introduction to the Theory of Binary Algebraic Forms](#) Sep 18 2021

The Theory of Equations Oct 20 2021

[The Numerical Solution of Ordinary and Partial Differential Equations](#) Nov 01 2022 This book presents methods for the computational solution of differential equations, both ordinary and partial, time-dependent and steady-state. Finite difference methods are introduced and analyzed in the first four chapters, and finite element methods are studied in chapter five. A very general-purpose and widely-used finite element program, PDE2D, which implements many of the methods studied in the earlier chapters, is presented and documented in Appendix A. The book contains the relevant theory and error analysis for most of the methods studied, but also emphasizes the practical aspects involved in implementing the methods. Students using this book will actually see and write programs (FORTRAN or MATLAB) for solving ordinary and partial differential equations, using both finite differences and finite elements. In addition, they will be able to solve very difficult partial differential equations using the software PDE2D, presented in Appendix A. PDE2D solves very general steady-state, time-dependent and eigenvalue PDE systems, in 1D intervals, general 2D regions, and a wide range of simple 3D regions. Contents: Direct Solution of Linear Systems Initial Value Ordinary Differential Equations The Initial Value Diffusion Problem The Initial Value Transport and Wave Problems Boundary Value Problems The Finite Element Methods Appendix A — Solving PDEs with PDE2D Appendix B — The Fourier Stability Method Appendix C — MATLAB Programs Appendix D — Answers to Selected Exercises Readership: Undergraduate, graduate students and researchers. Key Features: The discussion of stability, absolute stability and stiffness in Chapter 1 is clearer than in other texts Students will actually learn to write programs solving a range of simple PDEs using the finite element method in chapter 5 In Appendix A, students will be able to solve quite difficult PDEs, using the author's software package, PDE2D. (a free version is available which solves small to moderate sized problems) Keywords: Differential Equations; Partial Differential Equations; Finite Element Method; Finite Difference Method; Computational Science; Numerical Analysis Reviews: "This book is very well written and it is relatively easy to read. The presentation is clear and straightforward but quite rigorous. This book is suitable for a course on the numerical solution of ODEs and PDEs problems, designed for senior level undergraduate or beginning level graduate students. The numerical techniques for solving problems presented in the book may also be useful for experienced researchers and practitioners both from universities or industry." Andrzej Icha Pomeranian Academy in Slupsk Poland

Evolution Equations and Lagrangian Coordinates Jan 11 2021 Of the two basic methods for describing the motions of continua, discusses the Lagrange approach, in which the observer follows the path of particles, assuming all parameters of the motion to be functions of time and the initial positions of the particles. The method is sometimes preferable in dealing with the motions of continua involving free boundaries that are previously unknown. Presents insights into the algebraic and numerical aspects that the authors have developed at the Russian Academy of Sciences in Novosibirsk, and applies them to the Verigin problem, equivalence transformations of evolution equations, one-dimensional parabolic equations, and parabolic equations in several space dimensions. Annotation copyrighted by Book News, Inc., Portland, OR

Biology in Time and Space: A Partial Differential Equation Modeling Approach May 03 2020 How do biological objects communicate, make structures, make measurements and decisions, search for food, i.e., do all the things necessary for survival? Designed for an advanced undergraduate audience, this book uses mathematics to begin to tell that story. It builds on a background in multivariable calculus, ordinary differential equations, and basic stochastic processes and uses partial differential equations as the framework within which to explore these questions.

Partial Differential Equations V Jun 27 2022 The six articles in this EMS volume provide an overview of a number of contemporary techniques in the study of the asymptotic behavior of partial differential equations. These techniques include the Maslov canonical operator, semiclassical asymptotics of solutions and eigenfunctions, behavior of solutions near singular points of different kinds, matching of asymptotic expansions close to a boundary layer, and processes in inhomogeneous media. Asymptotic expansions are one of the most important areas in the theory of partial differential equations. Readers should find the wide variety of approaches of interest.

Stochastic Differential Equations Jul 29 2022 This volume consists of 15 articles written by experts in stochastic analysis. The first paper in the volume, Stochastic Evolution Equations by N V Krylov and B L Rozovskii, was originally published in Russian in 1979. After more than a quarter-century, this paper remains a standard reference in the field of stochastic partial differential equations (SPDEs) and continues to attract the attention of mathematicians of all generations. Together with a short but thorough introduction to SPDEs, it presents a number of optimal, and essentially unimprovable, results about solvability for a large class of both linear and non-linear equations. The other papers in this volume were specially written for the occasion of Prof Rozovskii's 60th birthday. They tackle a wide range of topics in the theory and applications of stochastic differential equations, both ordinary and with partial derivatives."

American Druggist Aug 25 2019

Functional Equations with Causal Operators Jul 05 2020 Functional equations encompass most of the equations used in applied science and engineering: ordinary differential equations, integral equations of the Volterra type, equations with delayed argument, and integro-differential equations of the Volterra type. The basic theory of functional equations includes functional differential equations with cau

The One-Dimensional Heat Equation Jul 17 2021 This is a version of Gevrey's classical treatise on the heat equations. Included in this volume are discussions of initial and/or boundary value problems, numerical methods, free boundary problems and parameter determination problems. The material is presented as a monograph and/or information source book. After the first six chapters of standard classical material, each

chapter is written as a self-contained unit except for an occasional reference to elementary definitions, theorems and lemmas in previous chapters.

Positive Solutions of Differential, Difference and Integral Equations Oct 27 2019 In analysing nonlinear phenomena many mathematical models give rise to problems for which only nonnegative solutions make sense. In the last few years this discipline has grown dramatically. This state-of-the-art volume offers the authors' recent work, reflecting some of the major advances in the field as well as the diversity of the subject. Audience: This volume will be of interest to graduate students and researchers in mathematical analysis and its applications, whose work involves ordinary differential equations, finite differences and integral equations.

Stochastic Controls Dec 30 2019 As is well known, Pontryagin's maximum principle and Bellman's dynamic programming are the two principal and most commonly used approaches in solving stochastic optimal control problems. * An interesting phenomenon one can observe from the literature is that these two approaches have been developed separately and independently. Since both methods are used to investigate the same problems, a natural question one will ask is the following: (Q) What is the relationship between the maximum principle and dynamic programming in stochastic optimal controls? There did exist some researches (prior to the 1980s) on the relationship between these two. Nevertheless, the results usually were restated in heuristic terms and proved under rather restrictive assumptions, which were not satisfied in most cases. In the statement of a Pontryagin-type maximum principle there is an adjoint equation, which is an ordinary differential equation (ODE) in the (finite-dimensional) deterministic case and a stochastic differential equation (SDE) in the stochastic case. The system consisting of the adjoint equation, the original state equation, and the maximum condition is referred to as an (extended) Hamiltonian system. On the other hand, in Bellman's dynamic programming, there is a partial differential equation (PDE), of first order in the (finite-dimensional) deterministic case and of second order in the stochastic case. This is known as a Hamilton-Jacobi-Bellman (HJB) equation.

Evolution of Systems in Random Media Sep 06 2020 Evolution of Systems in Random Media is an innovative, application-oriented text that explores stochastic models of evolutionary stochastic systems in random media. Specially designed for researchers and practitioners who do not have a background in random evolutions, the book allows non-experts to explore the potential information and applications that random evolutions can provide.

Waves and Rays in Elastic Continua Nov 28 2019 The present book — which is the third, significantly revised edition of the textbook originally published by Elsevier Science — emphasizes the interdependence of mathematical formulation and physical meaning in the description of seismic phenomena. Herein, we use aspects of continuum mechanics, wave theory and ray theory to explain phenomena resulting from the propagation of seismic waves. The book is divided into three main sections: Elastic Continua, Waves and Rays and Variational Formulation of Rays. There is also a fourth part, which consists of appendices. In Elastic Continua, we use continuum mechanics to describe the material through which seismic waves propagate, and to formulate a system of equations to study the behaviour of such a material. In Waves and Rays, we use these equations to identify the types of body waves propagating in elastic continua as well as to express their velocities and displacements in terms of the properties of these continua. To solve the equations of motion in anisotropic inhomogeneous continua, we invoke the concept of a ray. In Variational Formulation of Rays, we show that, in elastic continua, a ray is tantamount to a trajectory along which a seismic signal propagates in accordance with the variational principle of stationary traveltime. Consequently, many seismic problems in elastic continua can be conveniently formulated and solved using the calculus of variations. In the Appendices, we describe two mathematical concepts that are used in the book; namely, homogeneity of a function and Legendre's transformation. This section also contains a list of symbols. Request Inspection Copy

Advanced Engineering Mathematics Jun 03 2020 Now with a full-color design, the new Fourth Edition of Zill's Advanced Engineering Mathematics provides an in-depth overview of the many mathematical topics necessary for students planning a career in engineering or the sciences. A key strength of this text is Zill's emphasis on differential equations as mathematical models, discussing the constructs and pitfalls of each. The Fourth Edition is comprehensive, yet flexible, to meet the unique needs of various course offerings ranging from ordinary differential equations to vector calculus. Numerous new projects contributed by esteemed mathematicians have been added. New modern applications and engaging projects makes Zill's classic text a must-have text and resource for Engineering Math students!

Interacting Multiagent Systems Aug 06 2020 Mathematical modelling of systems constituted by many agents using kinetic theory is a new tool that has proved effective in predicting the emergence of collective behaviours and self-organization. This idea has been applied by the authors to various problems which range from sociology to economics and life sciences.

Group Properties Of The Acoustic Differential Equation Apr 13 2021 This text is an addition to the existing literature about the symmetrical properties of sound waves. The authors clarify the algebraic and analytical nature of the dynamic acoustic problem. Operator equations which are typical for linear systems and the more general Lie method are considered, which can be applied even to nonlinear problems. The information obtained allows the reader to construct different types of analytical solutions of the different acoustic equation. The acoustic differential equation describes sound waves in elastic media. If the media is non-homogeneous then the acoustic equation is generally very complicated and its exact solutions or analytical solutions may be considered as rare. This volume applies Lie algebra and Lie group techniques to separate independent variables and obtains exact analytical solutions. Special attention is paid to homogeneous and non-homogeneous media with different symmetry properties. The full wave acoustic equation is considered as well as the so-called phase acoustic equation which arises in the short-wave approximation.

Solution of Certain Problems in Quantum Mechanics Aug 30 2022 Intended for advanced undergraduates and graduate students in mathematics, physics, and chemistry, this concise treatment demonstrates the theory of special functions' use and application to problems in atomic and molecular physics. 2017 edition.

Ordinary Differential Equations with Applications Dec 22 2021 Based on a one-year course taught by the author to graduates at the University of Missouri, this book provides a student-friendly account of some of the standard topics encountered in an introductory course of ordinary differential equations. In a second semester, these ideas can be expanded by introducing more advanced concepts and applications. A central theme in the book is the use of Implicit Function Theorem, while the latter sections of the book introduce the basic ideas of perturbation theory as applications of this Theorem. The book also contains material differing from standard treatments, for example, the Fiber Contraction Principle is used to prove the smoothness of functions that are obtained as fixed points of contractions. The ideas introduced in this section can be extended to infinite dimensions.

Ginzburg-Landau Vortices Apr 01 2020 The Ginzburg-Landau equation as a mathematical model of superconductors has become an extremely useful tool in many areas of physics where vortices carrying a topological charge appear. The remarkable progress in the mathematical understanding of this equation involves a combined use of mathematical tools from many branches of mathematics. The Ginzburg-Landau model has been an amazing source of new problems and new ideas in analysis, geometry and topology. This collection will meet the urgent needs of the specialists, scholars and graduate students working in this area or related areas. Contents: Bifurcation Problems for Ginzburg-Landau Equations and Applications to Bose-Einstein Condensates (A Aftalion) Vortex Analysis of the Ginzburg-Landau Model of Superconductivity (E Sandier) On Singular Perturbation Problems Involving a "Circular-Well" Potential (I Shafrir) Existence Results on Ginzburg-Landau Equations (F Zhou) A Survey on Ginzburg-Landau Vortices of Superconducting Thin Films (S Ding) On the Hydro-dynamic Limit of Ginzburg-Landau Wave Vortices (F Lin & P Zhang) Singular Sets of the Landau-Lifshitz System (X Liu) Analysis of Ginzburg-Landau Models for Type I Superconductivity (F Yi) Ferromagnets and Landau-Lifshitz Equation (J Zhai) Readership: Specialists, scholars and graduate students in applied mathematics, applied science and related areas. Keywords: Ginzburg-Landau Equation; Superconductivity; Bifurcation Vortex Analysis; Singular Perturbation

Methods for Constructing Exact Solutions of Partial Differential Equations May 27 2022 Differential equations, especially nonlinear, present the most effective way for describing complex physical processes. Methods

for constructing exact solutions of differential equations play an important role in applied mathematics and mechanics. This book aims to provide scientists, engineers and students with an easy-to-follow, but comprehensive, description of the methods for constructing exact solutions of differential equations.

Computer Literature Bibliography: 1946-1963 Mar 01 2020

Initial-Boundary Value Problems and the Navier-Stokes Equation Mar 25 2022 Initial-Boundary Value Problems and the Navier-Stokes Equations gives an introduction to the vast subject of initial and initial-boundary value problems for PDEs. Applications to parabolic and hyperbolic systems are emphasized in this text. The Navier-Stokes equations for compressible and incompressible flows are taken as an example to illustrate the results. The subjects addressed in the book, such as the well-posedness of initial-boundary value problems, are of frequent interest when PDEs are used in modeling or when they are solved numerically. The book explains the principles of these subjects. The reader will learn what well-posedness or ill-posedness means and how it can be demonstrated for concrete problems. Audience: when the book was written, the main intent was to write a text on initial-boundary value problems that was accessible to a rather wide audience. Functional analytical prerequisites were kept to a minimum or were developed in the book. Boundary conditions are analyzed without first proving trace theorems, and similar simplifications have been used throughout. This book continues to be useful to researchers and graduate students in applied mathematics and engineering.

NASA Technical Paper Oct 08 2020

Handbook of Integral Equations Feb 21 2022 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, WienerHopf, Hammerstein, Uryson, and other equa

Nonlinear Functional Analysis and Its Applications Nov 08 2020

Dynamics of Vibro-Impact Systems Jul 25 2019 The EUROMECH Colloquium "Dynamics of Vibro-Impact Systems" was held at th th Loughborough University on September 15 _18 , 1998. This was the first international meeting on this subject continuing the traditions of the series of Russian meetings held regularly since 1963. Mechanical systems with multiple impact interactions have wide applications in engineering as the most intensive sources of mechanical influence on materials, structures and processes. Vibro-impact systems are used widely in machine dynamics, vibration engineering, and structural mechanics. Analysis of vibro-impact systems involves the investigation of mathematical models with discontinuities and reveals their behaviour as strongly non-linear. Such systems exhibit complex resonances, synchronisation and pulling, bifurcations and chaos, exCitation of space coherent structures, shock waves, and solitons. The aim of the Colloquium was to facilitate the exchange of up-to-date information on the analysis and synthesis of vibro-impact systems as well as on the new developments in excitation, control and applications of vibro-impact processes.

Advanced Engineering Mathematics Sep 30 2022 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. A Key Strength Of This Text Is Zill'S Emphasis On Differential Equations As Mathematical Models, Discussing The Constructs And Pitfalls Of Each. The Third Edition Is Comprehensive, Yet Flexible, To Meet The Unique Needs Of Various Course Offerings Ranging From Ordinary Differential Equations To Vector Calculus. 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 Accompany Advanced Engineering Mathematics, Third Edition: This Student Supplement Contains The Answers To Every Third Problem In The Textbook, Allowing Students To Assess Their Progress And Review Key Ideas And Concepts Discussed Throughout The Text. ISBN: 0-7637-4095-0

Ordinary and Partial Differential Equations Jan 23 2022 This book has been designed for Undergraduate (Honours) and Postgraduate students of various Indian Universities.A set of objective problems has been provided at the end of each chapter which will be useful to the aspirants of competitive examinations

Sturmian Theory for Ordinary Differential Equations Feb 09 2021

Nonlinear Parabolic and Elliptic Equations Jun 15 2021 In response to the growing use of reaction diffusion problems in many fields, this monograph gives a systematic treatment of a class of nonlinear parabolic and elliptic differential equations and their applications these problems. It is an important reference for mathematicians and engineers, as well as a practical text for graduate students.

Computer Literature Bibliography: 1964-1967 Jun 23 2019

Trapped Charged Particles Sep 26 2019 At Les Houches in January 2015, experts in the field of charged particle trapping came together for the Second Winter School on Physics with Trapped Charged Particles. This textbook collates the lectures delivered there, covering the fundamental physics of particle traps and the different types of applications of these devices. Taken as a whole, the book gives an overview of why traps for charged particles are important, how they work, their special features and limitations, and their application in areas such as precision measurements, mass spectrometry, optical clocks, plasma physics, antihydrogen creation, quantum simulation and quantum information processing. Chapters from various world experts include those on the basic properties of Penning traps and RF traps, as well as those covering important practical aspects such as vacuum systems, detection techniques, and different types of particle cooling, including laser cooling. Each individual chapter provides information and guidance on the application of the above methods. Additionally, each chapter is complemented by fully worked problems and solutions, making Trapped Charged Particles perfect for advanced undergraduate and postgraduate students new to this topic.

Contents:Penning TrapsRadiofrequency TrapsThe Guiding Center ApproximationToroidal SystemsUltrahigh Vacuum for Trapped IonsLaser Cooling Techniques Applicable to Trapped IonsNon-Laser Cooling TechniquesNumerical Simulations of Ion Cloud DynamicsPlasmas in Penning TrapsPlasma ModesRotating Wall Technique and Centrifugal SeparationCorrelations in Trapped PlasmaAutoresonanceAntihydrogen PhysicsIon Coulomb Crystals and Their ApplicationsCold Molecular Ions in TrapsPrecise Tests of Fundamental Symmetries with Trapped IonsTrapped-Ion Optical Frequency Standards Readership: Advanced undergraduate and postgraduate students studying the field of trapped charged particles.

Singular Integral Equations Dec 10 2020 In preparing this translation for publication certain minor modifications and additions have been introduced into the original Russian text, in order to increase its readability and usefulness. Thus, instead of the first person, the third person has been used throughout; wherever possible footnotes have been included with the main text. The chapters and their subsections of the Russian edition have been renamed parts and chapters respectively and the last have been numbered consecutively. An authors and subject index has been added. In particular, the former has been combined with the list of references of the original text, in order to enable the reader to find quickly all information on anyone reference in which he may be especially interested. This has been considered most important with a view to the difficulties experienced outside Russia in obtaining references, published in that country. Russian names have been printed in Russian letters in the authors index, in order to overcome any possible confusion arising from transliteration.

The Diagonal Infinity Nov 20 2021 CD-ROM consists of four directories: parametric plots, fractals, etc; nonlinear differential equations; fuzzy logics; and graphics files.

Uncertainty Modeling in Knowledge Engineering and Decision Making Aug 18 2021 FLINS, originally an acronym for Fuzzy Logic and Intelligent Technologies in Nuclear Science, is now extended to Computational Intelligence for applied research. The contributions to the 10th of FLINS conference cover state-of-the-art research, development, and technology for computational intelligence systems, both from the foundations and the applications points-of-view. Sample Chapter(s). Foreword (55 KB). Evaluation of Manufacturing Technology of Photovoltaic Cells (124 KB). Contents: Decision Making and Decision Support Systems; Uncertainty Modeling; Foundations of Computational Intelligence; Statistics, Data Analysis and Data Mining; Intelligent Information Processing; Productivity and Reliability; Applied Research. Readership: Graduate students, researchers, and academics in artificial intelligence/machine learning, information management, decision sciences, databases/information sciences and fuzzy logic.

The Solution of Equations Apr 25 2022

A Stability Technique for Evolution Partial Differential Equations Jan 29 2020 * Introduces a state-of-the-art method for the study of the asymptotic behavior of solutions to evolution partial differential equations. * Written by established mathematicians at the forefront of their field, this blend of delicate analysis and broad application is ideal for a course or seminar in asymptotic analysis and nonlinear PDEs. * Well-organized text with detailed index and bibliography, suitable as a course text or reference volume.

Fibonacci Numbers May 15 2021 Since their discovery hundreds of years ago, people have been fascinated by the wondrous properties of Fibonacci numbers. Being of mathematical significance in their own right, Fibonacci numbers have had an impact on areas like art and architecture, and their traces can be found in nature and even the behavior of the stock market. Starting with the basic properties of Fibonacci numbers, the present book explores their relevance in number theory, the theory of continued fractions, geometry and approximation theory. Rather than giving a complete account of the subject, a few chosen examples are treated exhaustively. They not only reveal the bearing of Fibonacci numbers on mathematics, but also provide very readable marvels of mathematical reasoning. This book is the translation of the 6th Russian edition (the first edition appeared in the early fifties and became a standard source of information on the subject).

Student Solutions Manual for Zill's Differential Equations with Boundary-Value Problems Mar 13 2021 Go beyond the answers -- see what it takes to get there and improve your grade! This manual provides worked-out, step-by-step solutions to select odd-numbered problems in the text, giving you the information you need to truly understand how these problems are solved. Each section begins with a list of key terms and concepts. The solutions sections also include hints and examples to guide you to greater understanding. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version.