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Functional and Impulsive Differential Equations of Fractional Order - Ivanka Stamova 2017-03-03
The book presents qualitative results for different classes of fractional equations, including fractional functional differential equations, fractional impulsive differential equations, and fractional impulsive functional differential equations, which have not been covered by other books. It manifests different constructive methods by demonstrating how these techniques can be applied to investigate qualitative properties of the solutions of fractional systems. Since many applications have been included, the demonstrated techniques and models can be

used in training students in mathematical modeling and in the study and development of fractional-order models.

Boundary Value Problems For Fractional Differential Equations And Systems - Bashir Ahmad 2021-02-18 This book is devoted to the study of existence of solutions or positive solutions for various classes of Riemann-Liouville and Caputo fractional differential equations, and systems of fractional differential equations subject to nonlocal boundary conditions. The monograph draws together many of the authors' results, that have been obtained and highly cited in the literature in the last four years.In each chapter, various examples are presented which support the main results. The methods used in the proof of these theorems include results from the fixed point theory and fixed point index theory. This volume can serve as a good resource for mathematical and scientific researchers, and for graduate students in mathematics and science interested in the existence of solutions for fractional differential equations and systems.

Schaum's Outline of Differential Equations, 4th Edition - Richard Bronson 2014-02-19 Tough Test Questions? Missed Lectures? Not Enough Time? Fortunately, there's Schaum's. This all-in-one-package includes more than 550 fully solved problems, examples, and practice exercises to sharpen your problem-solving skills. Plus, you will have access to 30 detailed videos featuring Math instructors who explain how to solve the most commonly tested problems--it's just like having your own virtual tutor! You'll find everything you need to build confidence, skills, and knowledge for the highest score possible. More than 40 million students have trusted Schaum's to help them succeed in the classroom and on exams. Schaum's is the key to faster learning and higher grades in every subject. Each Outline presents all the essential

course information in an easy-to-follow, topic-by-topic format. Helpful tables and illustrations increase your understanding of the subject at hand. This Schaum's Outline gives you 563 fully solved problems Concise explanation of all course concepts Covers first-order, second-order, and nth-order equations Fully compatible with your classroom text, Schaum's highlights all the important facts you need to know. Use Schaum's to shorten your study time--and get your best test scores! Schaum's Outlines--Problem Solved.

Generalized Fractional Order Differential Equations Arising in Physical Models - Santanu Saha Ray 2018-11-13 This book analyzes the various semi-analytical and analytical methods for finding approximate and exact solutions of fractional order partial differential equations. It explores approximate and exact solutions obtained by various analytical methods for fractional order partial differential equations arising in physical models.

Soft Computing for Problem Solving - Kedar Nath Das 2019-11-27 This two-volume book presents the outcomes of the 8th International Conference on Soft Computing for Problem Solving, SocProS 2018. This conference was a joint technical collaboration between the Soft Computing Research Society, Liverpool Hope University (UK), and Vellore Institute of Technology (India), and brought together researchers, engineers and practitioners to discuss thought-provoking developments and challenges in order to select potential future directions. The book highlights the latest advances and innovations in the interdisciplinary areas of soft computing, including original research papers on algorithms (artificial immune systems, artificial neural networks, genetic algorithms, genetic programming, and particle swarm optimization) and applications (control systems, data mining and clustering,

finance, weather forecasting, game theory, business and forecasting applications). It offers a valuable resource for both young and experienced researchers dealing with complex and intricate real-world problems that are difficult to solve using traditional methods.

Advanced Differential Calculus - A.K. Sharma 2010 Contents: Change of Independent Variables, Maxima and Minima (Of Functions of a Single Independent Variable), Maxima and Minima (Of Functions of Two Independent Variable), Maxima and Minima (Of Function of Several Independent Variable), Envelopes and Evolutes, Jacobians, Singular Points, Curve Tracing.

Frontiers in Fractional Calculus - Sachin Bhalekar 2018-03-21 This book brings together eleven topics on different aspects of fractional calculus in a single volume. It provides readers the basic knowledge of fractional calculus and introduces advanced topics and applications. The information in the book is presented in four parts: 1. Fractional Diffusion Equations: (i) solutions of fractional diffusion equations using wavelet methods, (ii) the maximum principle for time fractional diffusion equations, (iii) nonlinear sub-diffusion equations. 2. Mathematical Analysis: (i) shifted Jacobi polynomials for solving and identifying coupled fractional delay differential equations, (ii) the monotone iteration principle in the theory of Hadamard fractional delay differential equations, (iii) dynamics of fractional order modified Bhalekar-Gejji System, (iv) Grunwald-Letnikov derivatives. 3. Computational Techniques: GPU computing of special mathematical functions used in fractional calculus. 4. Reviews: (i) the popular iterative method NIM, (ii) fractional derivative with non-singular kernels, (iii) some open problems in fractional order nonlinear system This is a useful reference for researchers and graduate level

mathematics students seeking knowledge about of fractional calculus and applied mathematics.

Differential Calculus - Henri Cartan 1983

Examples and Solutions in the Differential Calculus - James Haddon 1851

Advanced Calculus - Harold M. Edwards 2013-12-01 This book is a high-level introduction to vector calculus based solidly on differential forms. Informal but sophisticated, it is geometrically and physically intuitive yet mathematically rigorous. It offers remarkably diverse applications, physical and mathematical, and provides a firm foundation for further studies.

Laplace Transforms and Their Applications to Differential Equations - N.W. McLachlan 2014-08-20 Classic graduate-level exposition covers theory and applications to ordinary and partial differential equations. Includes derivation of Laplace transforms of various functions, Laplace transform for a finite interval, and more. 1948 edition.

Solving Ordinary Differential Equations I - Ernst Hairer 2008-04-03 This book deals with methods for solving nonstiff ordinary differential equations. The first chapter describes the historical development of the classical theory, and the second chapter includes a modern treatment of Runge-Kutta and extrapolation methods. Chapter three begins with the classical theory of multistep methods, and concludes with the theory of general linear methods. The reader will benefit from many illustrations, a historical and didactic approach, and computer programs which help him/her learn to solve all kinds of ordinary differential equations. This new edition has been rewritten and new material has been included.

Numerical Analysis & Statistical Methods -

Functional Fractional Calculus - Shantanu Das

2011-06-01
When a new extraordinary and outstanding theory is stated, it has to face criticism and skepticism, because it is beyond the usual concept. The fractional calculus though not new, was not discussed or developed for a long time, particularly for lack of its application to real life problems. It is extraordinary because it does not deal with 'ordinary' differential calculus. It is outstanding because it can now be applied to situations where existing theories fail to give satisfactory results. In this book not only mathematical abstractions are discussed in a lucid manner, with physical mathematical and geometrical explanations, but also several practical applications are given particularly for system identification, description and then efficient controls. The normal physical laws like, transport theory, electrodynamics, equation of motions, elasticity, viscosity, and several others of are based on 'ordinary' calculus. In this book these physical laws are generalized in fractional calculus contexts; taking, heterogeneity effect in transport background, the space having traps or islands, irregular distribution of charges, non-ideal spring with mass connected to a pointless-mass ball, material behaving with viscous as well as elastic properties, system relaxation with and without memory, physics of random delay in computer network; and several others; mapping the reality of nature closely. The concept of fractional and complex order differentiation and integration are elaborated mathematically, physically and geometrically with examples. The practical utility of local fractional differentiation for enhancing the character of singularity at phase transition or characterizing the irregularity measure of response function is deliberated. Practical results of viscoelastic experiments, fractional order controls experiments, design of fractional controller and practical circuit synthesis for fractional order elements are

elaborated in this book. The book also maps theory of classical integer order differential equations to fractional calculus contexts, and deals in details with conflicting and demanding initialization issues, required in classical techniques. The book presents a modern approach to solve the 'solvable' system of fractional and other differential equations, linear, non-linear; without perturbation or transformations, but by applying physical principle of action-and-opposite-reaction, giving 'approximately exact' series solutions. Historically, Sir Isaac Newton and Gottfried Wihelm Leibniz independently discovered calculus in the middle of the 17th century. In recognition to this remarkable discovery, J.von Neumann remarked, "...the calculus was the first achievement of modern mathematics and it is difficult to overestimate its importance. I think it defines more equivocally than anything else the inception of modern mathematical analysis which is logical development, still constitute the greatest technical advance in exact thinking." This XXI century has thus started to 'think-exactly' for advancement in science & technology by growing application of fractional calculus, and this century has started speaking the language which nature understands the best.

Fractional-Order Models for Nuclear Reactor Analysis - Gilberto Espinosa Paredes 2020-10-22
Fractional-Order Models for Nuclear Reactor Analysis presents fractional modeling issues in the context of anomalous diffusion processes in an accessible and practical way. The book emphasizes the importance of non-Fickian diffusion in heterogeneous systems as the core of the nuclear reactor, as well as different variations of diffusion processes in nuclear reactors which are presented to establish the importance of nuclear and thermohyraulic phenomena and the physical side effects of feedback. In addition, the book analyzes

core issues in fractional modeling in nuclear reactors surrounding phenomenological description and important analytical sub-diffusive processes in the transport neutron. Users will find the most innovative modeling techniques of nuclear reactors using operator differentials of fractional order and applications in nuclear design and reactor dynamics. Proposed methods are tested with Boltzmann equations and non-linear order models alongside real data from nuclear power plants, making this a valuable resource for nuclear professionals, researchers and graduate students, as well as those working in nuclear research centers with expertise in mathematical modeling, physics and control. Presents and analyzes a new paradigm of nuclear reactor phenomena with fractional modeling Considers principles of fractional calculation, methods of solving differential equations of fractional order, and their applications Includes methodologies of linear and nonlinear analysis, along with design and dynamic analyses

Handbook of Research on Fuzzy and Rough Set Theory in Organizational Decision Making - Sangaiah, Arun Kumar 2016-10-17
Soft computing techniques are innovative tools that use nature-inspired algorithms to run predictive analysis of industries from business to software measurement. These tools have gained momentum in recent years for their practicality and flexibility. The Handbook of Research on Fuzzy and Rough Set Theory in Organizational Decision Making collects both empirical and applied research in the field of fuzzy set theory, and bridges the gap between the application of soft computational approaches and the organizational decision making process. This publication is a pivotal reference for business professionals, IT specialists, software engineers, and advanced students of business and information technology.

The Malliavin Calculus - Denis R. Bell 2012-12-03 This introductory text presents detailed accounts of the different forms of the theory developed by Stroock and Bismut, discussions of the relationship between these two approaches, and a variety of applications. 1987 edition.

Fixed Point Theory and Fractional Calculus - Pradip Debnath 2022 This book collects chapters on fixed-point theory and fractional calculus and their applications in science and engineering. It discusses state-of-the-art developments in these two areas through original new contributions from scientists across the world. It contains several useful tools and techniques to develop their skills and expertise in fixed-point theory and fractional calculus. New research directions are also indicated in chapters. This book is meant for graduate students and researchers willing to expand their knowledge in these areas. The minimum prerequisite for readers is the graduate-level knowledge of analysis, topology and functional analysis.

Mathematical Analysis: Problems & Solutions -

Differential Calculus - Shanti Narayan 2005-03 This textbook commences with a brief outline of development of real numbers, their expression as infinite decimals and their representation by points along a line. While the first part of the textbook is analytical, the latter part deals with the geometrical applications of the subject. Numerous examples and exercises have been provided to support student's understanding. This textbook has been designed to meet the requirements of undergraduate students of BA and BSc courses.

Partial Differential Equations - Walter A. Strauss 2007-12-21 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.

Functional Fractional Calculus - Shantanu Das 2011-06-01 When a new extraordinary and outstanding theory is stated, it has to face criticism and skeptism, because it is beyond the usual concept. The fractional calculus though not new, was not discussed or developed for a long time, particularly for lack of its application to real life problems. It is extraordinary because it does not deal with 'ordinary' differential calculus. It is outstanding because it can now be applied to situations where existing theories fail to give satisfactory results. In this book not only mathematical abstractions are discussed in a lucid manner, with physical mathematical and geometrical explanations, but also several practical applications are given particularly for system identification, description and then efficient controls. The normal physical laws like, transport theory, electrodynamics, equation of

motions, elasticity, viscosity, and several others of are based on 'ordinary' calculus. In this book these physical laws are generalized in fractional calculus contexts; taking, heterogeneity effect in transport background, the space having traps or islands, irregular distribution of charges, non-ideal spring with mass connected to a pointless-mass ball, material behaving with viscous as well as elastic properties, system relaxation with and without memory, physics of random delay in computer network; and several others; mapping the reality of nature closely. The concept of fractional and complex order differentiation and integration are elaborated mathematically, physically and geometrically with examples. The practical utility of local fractional differentiation for enhancing the character of singularity at phase transition or characterizing the irregularity measure of response function is deliberated. Practical results of viscoelastic experiments, fractional order controls

experiments, design of fractional controller and practical circuit synthesis for fractional order elements are elaborated in this book. The book also maps theory of classical integer order differential equations to fractional calculus contexts, and deals in details with conflicting and demanding initialization issues, required in classical techniques. The book presents a modern approach to solve the 'solvable' system of fractional and other differential equations, linear, non-linear; without perturbation or transformations, but by applying physical principle of action-and-opposite-reaction, giving 'approximately exact' series solutions. Historically, Sir Isaac Newton and Gottfried Wihelm Leibniz independently discovered calculus in the middle of the 17th century. In recognition to this remarkable discovery, J.von Neumann remarked, "...the calculus was the first achievement of modern mathematics and it is difficult to overestimate its importance. I think it defines

more equivocally than anything else the inception of modern mathematical analysis which is logical development, still constitute the greatest technical advance in exact thinking." This XXI century has thus started to 'think-exactly' for advancement in science & technology by growing application of fractional calculus, and this century has started speaking the language which nature understands the best.
Applied Mechanics Reviews - 1972

Examples and Solutions in the Differential Calculus by James Haddon - James Haddon 1851

Library of Congress Subject Headings - Library of Congress 2011

Introduction to Partial Differential Equations with Applications - E. C.
Zachmanoglou 2012-04-20
This text explores the essentials of partial differential equations as applied to engineering and the physical sciences. Discusses ordinary differential equations, integral curves and surfaces of vector fields, the Cauchy-Kovalevsky theory, more. Problems and answers.

Recent Advances in Intelligent Information Systems and Applied Mathematics - Oscar Castillo 2020-01-31
This book describes the latest advances in intelligent techniques such as fuzzy logic, neural networks, and optimization algorithms, and their relevance in building intelligent information systems in combination with applied mathematics. The authors also outline the applications of these systems in areas like intelligent control and robotics, pattern recognition, medical diagnosis, time series prediction, and optimization of complex problems. By sharing fresh ideas and identifying new targets/problems it offers young researchers and students new directions for their future research. The book is intended for readers from mathematics and computer

science, in particular professors and students working on theory and applications of intelligent systems for real-world applications.

Text Book Of Differential Calculus - A.K. Sharma 2004 This book on Differential Calculus has been written for the use of the students of degree and honours classes of Indian Universities. The subject matter has been discussed in such a simple way that the students will find no difficulty to understand it. The theories and articles have been explained in detailed in a nice manner and all the examples have been completely solved. Self practice problems in such chapter will help students self evaluation. Hints and answers to self practice problems enable to students learn at their own pace. The book contains almost all the questions set at various examinations held by Indian Universities and it covers to syllabi of all Indian Universities. Contents: Function of Real Variable, Limits, Continuity and Differentiability, Rolle s Theorem, Mean Value Theorems, Taylor s and Maclaurin s Theorems, Differentiation, Successive Differentiation, Expansions of Functions, Partial Differential, Indeterminate Forms, Tangents and Norms, Curvature, Asymptotes.

Calculus with Analytic Geometry - Earl William Swokowski 1979

The Claim of Leibnitz to the Invention of the Differential Calculus - H. Sloman 1860

Encyclopaedia Metropolitana: Plates to Mixed Sciences, Vol. 5 and 6 - Edward Smedley 1845

Library of Congress Subject Headings - Library of Congress. Cataloging Policy and Support Office 2009

Mathematical Questions and Solutions, from the "Educational Times." - 1865

Notes for a Romantic

Encyclopaedia - Novalis
2012-02-01
The first English translation of Novalis's unfinished notes for a universal science, Das Allgemeine Brouillon.

Mathematical Questions and Solutions, from the "Educational Times" - W. J. C. Miller 1865

Bulletin of the Public Library of the City of Boston - Boston Public Library 1891

Advanced Calculus - Lynn Harold Loomis 2014-02-26 An authorised reissue of the long out of print classic textbook, Advanced Calculus by the late Dr Lynn Loomis and Dr Shlomo Sternberg both of Harvard University has been a revered but hard to find textbook for the advanced calculus course for decades. This book is based on an honors course in advanced calculus that the authors gave in the 1960's. The foundational material, presented in the unstarred sections of Chapters 1 through 11, was normally covered, but different applications of this basic material were stressed from year to year, and the book therefore contains more material than was covered in any one year. It can accordingly be used (with omissions) as a text for a year's course in advanced calculus, or as a text for a three-semester introduction to analysis. The prerequisites are a good grounding in the calculus of one variable from a mathematically rigorous point of view, together with some acquaintance with linear algebra. The reader should be familiar with limit and continuity type arguments and have a certain amount of mathematical sophistication. As possible introductory texts, we mention Differential and Integral Calculus by R Courant, Calculus by T Apostol, Calculus by M Spivak, and Pure Mathematics by G Hardy. The reader should also have some experience with partial derivatives. In overall plan the book divides roughly into a first half which develops the calculus (principally the

differential calculus) in the setting of normed vector spaces, and a second half which deals with the calculus of differentiable manifolds.

Recent Investigations of Differential and Fractional Equations and Inclusions - Snezhana Hristova 2021-02-22 During the past decades, the subject of calculus of integrals and derivatives of any arbitrary real or complex order has gained considerable popularity and impact. This is mainly due to its demonstrated applications in numerous seemingly diverse and widespread fields of science and engineering. In connection with this, great importance is attached to the publication of results that focus on recent and novel developments in the theory of any types of differential and fractional differential equation and inclusions, especially covering analytical and numerical research for such kinds of equations. This book is a compilation of articles from a Special Issue of Mathematics devoted to the topic of "Recent Investigations of Differential and Fractional Equations and Inclusions". It contains some theoretical works and approximate methods in fractional differential equations and inclusions as well as fuzzy integrodifferential equations. Many of the papers were supported by the Bulgarian National Science Fund under Project KP-06-N32/7. Overall, the volume is an excellent witness of the relevance of the theory of fractional differential equations.

Advances in the Homotopy Analysis Method - Shijun Liao 2013-11-26 Unlike other analytic techniques, the Homotopy Analysis Method (HAM) is independent of small/large physical parameters. Besides, it provides great freedom to choose equation type and solution expression of related linear high-order approximation equations. The HAM provides a simple way to guarantee the convergence of solution series. Such uniqueness differentiates the HAM from all other analytic

approximation methods. In addition, the HAM can be applied to solve some challenging problems with high nonlinearity. This book, edited by the pioneer and founder of the HAM, describes the current advances of this powerful analytic approximation method for highly nonlinear problems. Coming from different countries and fields of research, the authors of each chapter are top experts in the HAM and its applications. Contents:Chance and Challenge: A Brief Review of Homotopy Analysis Method (S-J Liao)Predictor Homotopy Analysis Method (PHAM) (S Abbasbandy and E Shivanian)Spectral Homotopy Analysis Method for Nonlinear Boundary Value Problems (S Motsa and P Sibanda)Stability of Auxiliary Linear Operator and Convergence-Control Parameter (R A Van Gorder)A Convergence Condition of the Homotopy Analysis Method (M Turkyilmazoglu)Homotopy Analysis Method for Some Boundary Layer Flows of Nanofluids (T Hayat and M Mustafa)Homotopy Analysis Method for Fractional Swift–Hohenberg Equation (S Das and K Vishal)HAM-Based Package NOPH for Periodic Oscillations of Nonlinear Dynamic Systems (Y-P Liu)HAM-Based Mathematica Package BVPh 2.0 for Nonlinear Boundary Value Problems (Y-L Zhao and S-J Liao) Readership: Graduate students and researchers in applied mathematics, physics, nonlinear mechanics, engineering and finance. Keywords:Analytic Approxiamtion Method;Nonlinear;Homotopy;Applied MathematicsKey Features:The method described in the book can overcome almost all restrictions of other analytic approximation method for nonlinear problemsThis book is the first in homotopy analysis method, covering the newest advances, contributed by many top experts in different fields *Basic Training in Mathematics* - R. Shankar 2013-12-20 Based on course material used by the author at Yale

University, this practical text addresses the widening gap found between the mathematics required for upper-level courses in the physical sciences and the knowledge of incoming students. This superb book offers students an excellent opportunity to strengthen their mathematical skills by solving various problems in differential calculus. By covering material in its simplest form, students can look forward to a smooth entry into any course in the physical sciences.