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Nonlinear Functional Analysis and Its Applications Applied Functional Analysis Nonlinear Functional Analysis and Its Applications: Fixed-Point theorems Linear and Nonlinear Functional Analysis with Applications Nonlinear Functional Analysis and Its Applications Quantum Field Theory III: Gauge Theory Travelling Waves And Periodic Oscillations In Fermi-pasta-ulam Lattices Nonlinear Functional Analysis Handbook of Applied Analysis Nonlinear Analysis Real and Functional Analysis Nonlinear Inclusions and Hemivariational Inequalities Foundations of Mathematical Economics Analysis and Approximation of Contact Problems with Adhesion or Damage An Introduction to Nonlinear Analysis and Fixed Point Theory Theoretical Numerical Analysis Applications of Functional Analysis and Operator Theory Inverse Problems, Image Analysis, and Medical Imaging Relaxation in Optimization Theory and Variational Calculus Plasticity Nonlinear Functional Analysis and its Applications Variational Inequalities with Applications Scalar and Asymptotic Scalar Derivatives Inherently Parallel Algorithms in Feasibility and Optimization and their Applications Nonlinear Differential Equations in Ordered Spaces Topics in Mathematical Fluid Mechanics Sobolev Spaces of Fractional Order, Nemytskij Operators, and Nonlinear Partial Differential Equations Computational Methods for Inverse Problems Handbook of Metric Fixed Point Theory A Relaxation-Based Approach to Optimal Control of Hybrid and Switched Systems Mathematical Models in Contact Mechanics The Numerical Solution of Integral Equations of the Second Kind A Topological Introduction to Nonlinear Analysis Numerical Methods for Nonlinear Elliptic Differential Equations Differential-Algebraic Equations: A Projector Based Analysis Quantum Field Theory II: Quantum Electrodynamics ⬚ ⬚ ⬚ ⬚ ⬚ ⬚ ⬚ ⬚ ⬚ ⬚ ⬚ Variational-Hemivaria Inequalities with Applications Pseudo-Monotone Operator Theory for Unsteady Problems with Variable Exponents Pseudodifferential Operators and Wavelets over Real and p-adic Fields

Nonlinear Functional Analysis and Its Applications

1985-12-13

from the reviews has a flowing coherent form and contains nice comments overviews and perspectives on the strategy and implementations of the considered procedures and is concluded with complementary problems moreover at the end of each volume there is a comprehensive and up to date bibliography the work is clearly written and organized so that each chapter can be independently approached zentralblatt für mathematik und ihre grenzgebiete the book is in fact dedicated to a large area of applications mathematicians engineers and natural scientists will find many interesting results acta applicandae mathematicae

Applied Functional Analysis

2012-12-06

the first part of a self contained elementary textbook combining linear functional analysis nonlinear functional analysis numerical functional analysis and their substantial applications with each other as such the book addresses undergraduate students and beginning graduate students of mathematics physics and engineering who want to learn how functional analysis elegantly solves mathematical problems which relate to our real world applications concern ordinary and partial differential equations the method of finite elements integral equations special functions both the schroedinger approach and the feynman approach to quantum physics and quantum statistics as a prerequisite readers should be familiar with some basic facts of calculus the second part has been published under the title applied functional analysis main principles and their applications

Nonlinear Functional Analysis and Its Applications: Fixed-Point theorems

1986

this single volume textbook covers the fundamentals of linear and nonlinear functional analysis illustrating most of the basic theorems with numerous applications to linear and nonlinear partial differential equations and to selected topics from numerical analysis and optimization theory this book has pedagogical appeal because it features self contained and complete proofs of most of the theorems some of which are not always easy to locate in the literature or are difficult to reconstitute it also offers 401 problems and 52 figures plus historical notes and many original references that provide an idea of the genesis of the important results and it covers most of the core topics from functional analysis

Linear and Nonlinear Functional Analysis with Applications

2013-10-10

the fourth of a five volume exposition of the main principles of nonlinear functional analysis and its applications to the natural sciences economics and numerical analysis the presentation is self contained and accessible to the non specialist and topics covered include applications to mechanics elasticity plasticity hydrodynamics thermodynamics statistical physics and special and general relativity including cosmology the book contains a detailed physical motivation of the relevant basic equations and a discussion of particular problems which have played a significant role in the development of physics and through which important mathematical and physical insight may be gained it combines classical and modern ideas to build a bridge between the language and thoughts of physicists and mathematicians many exercises and a comprehensive bibliography complement the text

Nonlinear Functional Analysis and Its Applications

1986

in this third volume of his modern introduction to quantum field theory eberhard zeidler examines the mathematical and physical aspects of gauge theory as a principle tool for describing the four fundamental forces which act in the universe gravitative electromagnetic weak interaction and strong interaction volume iii concentrates on the classical aspects of gauge theory describing the four fundamental forces by the curvature of appropriate fiber bundles this must be supplemented by the crucial but elusive quantization procedure the book is arranged in four sections devoted to realizing the universal principle force equals curvature part i the euclidean manifold as a paradigm part ii ariadne s thread in gauge theory part iii einstein s theory of special relativity part iv ariadne s thread in cohomology for students of mathematics the book is designed to demonstrate that detailed knowledge of the physical background helps to reveal interesting interrelationships among diverse mathematical topics physics students will be exposed to a fairly advanced mathematics beyond the level covered in the typical physics curriculum quantum field theory builds a bridge between mathematicians and physicists based on challenging questions about the fundamental forces in the universe macrocosmos and in the world of elementary particles microcosmos

Quantum Field Theory III: Gauge Theory

2011-08-17

this is a unique book that presents rigorous mathematical results on fermi pasta ulam lattices a field of great interest in nonlinear analysis nonlinear science mathematical physics etc it considers travelling waves and time periodic oscillations in infinite fermi pasta ulam lattices which are not necessarily spatially homogenous similar systems infinite chains of linearly coupled nonlinear oscillators are also discussed the book is self contained and includes a number of open problems making it suitable for use in a course for graduate students a

Travelling Waves And Periodic Oscillations In Fermi-pasta-ulam Lattices

2005-03-01

topics however only a modest preliminary knowledge is needed in the first chapter where we introduce an important topological concept the so called topological degree for continuous maps from subsets ofrn into rn you need not know anything about functional analysis starting with chapter 2 where infinite dimensions first appear one should be familiar with the essential step of consider ing a sequence or a function of some sort as a point in the corresponding vector space of all such sequences or functions whenever this abstraction is worthwhile one should also work out the things which are proved in 7 and accept certain basic principles of linear functional analysis quoted there for easier references until they are applied in later chapters in other words even the completely linear sections which we have included for your convenience serve only as a vehicle for progress in nonlinearity another point that makes the text introductory is the use of an essentially uniform mathematical language and way of thinking one which is no doubt familiar from elementary lectures in analysis that did not worry much about its connections with algebra and topology of course we shall use some elementary topological concepts which may be new but in fact only a few remarks here and there pertain to algebraic or differential topological concepts and methods

Nonlinear Functional Analysis

2013-11-11

this handbook provides an in depth examination of important theoretical methods and procedures in applied analysis it details many of the most important theoretical trends in nonlinear analysis and applications to different fields these features make the volume a valuable tool for every researcher working on nonlinear analysis

Handbook of Applied Analysis

2009-05-31

nonlinear analysis is a broad interdisciplinary field characterized by a remarkable mixture of analysis topology and applications its concepts and techniques provide the tools for developing more realistic and accurate models for a variety of phenomena encountered in fields ranging from engineering and chemistry to economics and biology thi

Nonlinear Analysis

2005-07-27

this book is based on lectures given at mekhmat the department of mechanics and mathematics at moscow state university one of the top mathematical departments worldwide with a rich tradition of teaching functional analysis featuring an advanced course on real and functional analysis the book presents not only core material traditionally included in university courses of different levels but also a survey of the most important results of a more subtle nature which cannot be considered basic but which are useful for applications further it includes several hundred exercises of varying difficulty with tips and references the book is intended for graduate and phd students studying real and functional analysis as well as mathematicians and physicists whose research is related to functional analysis

Real and Functional Analysis

2020-02-25

this book introduces the reader the theory of nonlinear inclusions and hemivariational inequalities with emphasis on the study of contact mechanics the work covers both abstract results in the area of nonlinear inclusions hemivariational inequalities as well as the study of specific contact problems including their modelling and their variational analysis provided results are based on original research on the existence uniqueness regularity and behavior of the solution for various classes of nonlinear stationary and evolutionary inclusions in carrying out the variational analysis of various contact models one systematically uses results of hemivariational inequalities and in this way illustrates the applications of nonlinear analysis in contact mechanics new mathematical methods are introduced and applied in the study of nonlinear problems which describe the contact between a deformable body and a foundation contact problems arise in industry engineering and geophysics their variational analysis presented in this book lies the background for their numerical analysis this volume will interest mathematicians applied mathematicians engineers and scientists as well as advanced graduate students

Nonlinear Inclusions and Hemivariational Inequalities

2012-09-18

this book provides a comprehensive introduction to the mathematical foundations of economics from basic set theory to fixed point theorems and constrained optimization rather than simply offer a

collection of problem solving techniques the book emphasizes the unifying mathematical principles that underlie economics features include an extended presentation of separation theorems and their applications an account of constraint qualification in constrained optimization and an introduction to monotone comparative statics these topics are developed by way of more than 800 exercises the book is designed to be used as a graduate text a resource for self study and a reference for the professional economist

Foundations of Mathematical Economics

2001-10-26

research into contact problems continues to produce a rapidly growing body of knowledge recognizing the need for a single concise source of information on models and analysis of contact problems accomplished experts sofonea han and shillor carefully selected several models and thoroughly study them in analysis and approximation of contact p

Analysis and Approximation of Contact Problems with Adhesion or Damage

2005-09-26

this book systematically introduces the theory of nonlinear analysis providing an overview of topics such as geometry of banach spaces differential calculus in banach spaces monotone operators and fixed point theorems it also discusses degree theory nonlinear matrix equations control theory differential and integral equations and inclusions the book presents surjectivity theorems variational inequalities stochastic game theory and mathematical biology along with a large number of applications of these theories in various other disciplines nonlinear analysis is characterised by its applications in numerous interdisciplinary fields ranging from engineering to space science hydromechanics to astrophysics chemistry to biology theoretical mechanics to biomechanics and economics to stochastic game theory organised into ten chapters the book shows the elegance of the subject and its deep rooted concepts and techniques which provide the tools for developing more realistic and accurate models for a variety of phenomena encountered in diverse applied fields it is intended for graduate and undergraduate students of mathematics and engineering who are familiar with discrete mathematical structures differential and integral equations operator theory measure theory banach and hilbert spaces locally convex topological vector spaces and linear functional analysis

An Introduction to Nonlinear Analysis and Fixed Point Theory

2018-05-19

this book gives an introduction to functional analysis in a way that is tailored to fit the needs of the researcher or student the book explains the basic results of functional analysis as well as relevant topics in numerical analysis applications of functional analysis are given by considering numerical methods for solving partial differential equations and integral equations the material is especially useful for researchers and students who wish to work in theoretical numerical analysis and seek a background in the tools of the trade covered in this book

Theoretical Numerical Analysis

2001-03-09

functional analysis is a powerful tool when applied to mathematical problems arising from physical situations the present book provides by careful selection of material a collection of concepts and

techniques essential for the modern practitioner emphasis is placed on the solution of equations including nonlinear and partial differential equations the assumed background is limited to elementary real variable theory and finite dimensional vector spaces provides an ideal transition between introductory math courses and advanced graduate study in applied mathematics the physical sciences or engineering gives the reader a keen understanding of applied functional analysis building progressively from simple background material to the deepest and most significant results introduces each new topic with a clear concise explanation includes numerous examples linking fundamental principles with applications solidifies the reader s understanding with numerous end of chapter problems

Applications of Functional Analysis and Operator Theory

2005-02-08

this book contains the proceedings of the special session interaction of inverse problems and image analysis held at the january 2001 meeting of the ams in new orleans la the common thread among inverse problems signal analysis and image analysis is a canonical problem recovering an object function signal picture from partial or indirect information about the object both inverse problems and imaging science have emerged in recent years as interdisciplinary research fields with profound applications in many areas of science engineering technology and medicine research in inverse problems and image processing shows rich interaction with several areas of mathematics and strong links to signal processing variational problems applied harmonic analysis and computational mathematics this volume contains carefully referred and edited original research papers and high level survey papers that provide overview and perspective on the interaction of inverse problems image analysis and medical imaging the book is suitable for graduate students and researchers interested in signal and image processing and medical imaging

Inverse Problems, Image Analysis, and Medical Imaging

2002

the relaxation method has enjoyed an intensive development during many decades and this new edition of this comprehensive text reflects in particular the main achievements in the past 20 years moreover many further improvements and extensions are included both in the direction of optimal control and optimal design as well as in numerics and applications in materials science along with an updated treatment of the abstract parts of the theory

Relaxation in Optimization Theory and Variational Calculus

2020-11-09

focussing on theoretical aspects of the small strain theory of hardening elastoplasticity this monograph provides a comprehensive and unified treatment of the mathematical theory and numerical analysis exploiting in particular the great advantages gained by placing the theory in a convex analytic context divided into three parts the first part of the text provides a detailed introduction to plasticity in which the mechanics of elastoplastic behaviour is emphasised while the second part is taken up with mathematical analysis of the elastoplasticity problem the third part is devoted to error analysis of various semi discrete and fully discrete approximations for variational formulations of the elastoplasticity

Plasticity

2006-05-17

this is the second of a five volume exposition of the main principles of nonlinear functional analysis and its applications to the natural sciences economics and numerical analysis the presentation is self contained and accessible to the nonspecialist part ii concerns the theory of monotone operators it is divided into two subvolumes ii a and ii b which form a unit the present part ii a is devoted to linear monotone operators it serves as an elementary introduction to the modern functional analytic treatment of variational problems integral equations and partial differential equations of elliptic parabolic and hyperbolic type this book also represents an introduction to numerical functional analysis with applications to the ritz method along with the method of finite elements the galerkin methods and the difference method many exercises complement the text the theory of monotone operators is closely related to hilbert s rigorous justification of the dirichlet principle and to the 19th and 20th problems of hilbert which he formulated in his famous paris lecture in 1900 and which strongly influenced the development of analysis in the twentieth century

Nonlinear Functional Analysis and its Applications

2013-11-21

this book is motivated by stimulating problems in contact mechanics emphasizing antiplane frictional contact with linearly elastic and viscoelastic materials it focuses on the essentials with respect to the qualitative aspects of several classes of variational inequalities vis clearly presented easy to follow and well referenced this work treats almost entirely vis of the second kind with much of the material being state of the art

Variational Inequalities with Applications

2009-04-05

this extremely useful book is devoted to the study of scalar and asymptotic scalar derivatives and their applications to some problems in nonlinear analysis riemannian geometry and applied mathematics the theoretical results are developed in particular with respect to the study of complementarity problems monotonicity of nonlinear mappings and the non gradient type monotonicity on riemannian manifolds the text is intended for researchers and graduate students working in the fields of nonlinear analysis riemannian geometry and applied mathematics

Scalar and Asymptotic Scalar Derivatives

2008-05-21

the haifa 2000 workshop on inherently parallel algorithms for feasibility and optimization and their applications brought together top scientists in this area the objective of the workshop was to discuss analyze and compare the latest developments in this fast growing field of applied mathematics and to identify topics of research which are of special interest for industrial applications and for further theoretical study inherently parallel algorithms that is computational methods which are by their mathematical nature parallel have been studied in various contexts for more than fifty years however it was only during the last decade that they have mostly proved their practical usefulness because new generations of computers made their implementation possible in order to solve complex feasibility and optimization problems involving huge amounts of data via parallel processing these led to an accumulation of computational experience and theoretical information and opened new and challenging questions concerning the behavior of inherently parallel algorithms for feasibility and optimization their convergence in new environments and in

circumstances in which they were not considered before their stability and reliability several research groups all over the world focused on these questions and it was the general feeling among scientists involved in this effort that the time has come to survey the latest progress and convey a perspective for further development and concerted scientific investigations thus the editors of this volume with the support of the israeli academy for sciences and humanities took the initiative of organizing a workshop intended to bring together the leading scientists in the field the current volume is the proceedings of the workshop representing the discussions debates and communications that took place having all that information collected in a single book will provide mathematicians and engineers interested in the theoretical and practical aspects of the inherently parallel algorithms for feasibility and optimization with a tool for determining when where and which algorithms in this class are fit for solving specific problems how reliable they are how they behave and how efficient they were in previous applications such a tool will allow software creators to choose ways of better implementing these methods by learning from existing experience

Inherently Parallel Algorithms in Feasibility and Optimization and their Applications

2001-06-18

extremality results proved in this monograph for an abstract operator equation provide the theoretical framework for developing new methods that allow the treatment of a variety of discontinuous initial and boundary value problems for both ordinary and partial differential equations in explicit and implicit forms by means of these extremality results the authors prove the existence of extremal solutions between appropriate upper and lower solutions of first and second order discontinuous implicit and explicit ordinary and functional differential equations they then study the dependence of these extremal solutions on the data the authors begin by developing an existence theory for an abstract operator equation in ordered spaces and offer new tools for dealing with different kinds of discontinuous implicit and explicit differential equation problems they present a unified approach to the existence of extremal solutions of quasilinear elliptic and parabolic problems and extend the upper and lower solution method to elliptic and parabolic inclusion of hemivariation type using variational and nonvariational methods nonlinear differential equations in ordered spaces includes research that appears for the first time in book form and is designed as a source book for pure and applied mathematicians its self contained presentation along with numerous worked examples and complete detailed proofs also make it accessible to researchers in engineering as well as advanced students in these fields

Nonlinear Differential Equations in Ordered Spaces

2000-06-14

this volume brings together five contributions to mathematical fluid mechanics a classical but still very active research field which overlaps with physics and engineering the contributions cover not only the classical navier stokes equations for an incompressible newtonian fluid but also generalized newtonian fluids fluids interacting with particles and with solids and stochastic models the questions addressed in the lectures range from the basic problems of existence of weak and more regular solutions the local regularity theory and analysis of potential singularities qualitative and quantitative results about the behavior in special cases asymptotic behavior statistical properties and ergodicity

Topics in Mathematical Fluid Mechanics

2013-04-03

the series is devoted to the publication of high level monographs which cover the whole spectrum of current nonlinear analysis and applications in various fields such as optimization control theory systems theory mechanics engineering and other sciences one of its main objectives is to make available to the professional community expositions of results and foundations of methods that

play an important role in both the theory and applications of nonlinear analysis contributions which are on the borderline of nonlinear analysis and related fields and which stimulate further research at the crossroads of these areas are particularly welcome please submit book proposals to jürgen appell

Sobolev Spaces of Fractional Order, Nemytskij Operators, and Nonlinear Partial Differential Equations

2011-07-22

provides a basic understanding of both the underlying mathematics and the computational methods used to solve inverse problems

Computational Methods for Inverse Problems

2002-01-01

metric fixed point theory encompasses the branch of fixed point theory which metric conditions on the underlying space and or on the mappings play a fundamental role in some sense the theory is a far reaching outgrowth of banach s contraction mapping principle a natural extension of the study of contractions is the limiting case when the lipschitz constant is allowed to equal one such mappings are called nonexpansive nonexpansive mappings arise in a variety of natural ways for example in the study of holomorphic mappings and hyperconvex metric spaces because most of the spaces studied in analysis share many algebraic and topological properties as well as metric properties there is no clear line separating metric fixed point theory from the topological or set theoretic branch of the theory also because of its metric underpinnings metric fixed point theory has provided the motivation for the study of many geometric properties of banach spaces the contents of this handbook reflect all of these facts the purpose of the handbook is to provide a primary resource for anyone interested in fixed point theory with a metric flavor the goal is to provide information for those wishing to find results that might apply to their own work and for those wishing to obtain a deeper understanding of the theory the book should be of interest to a wide range of researchers in mathematical analysis as well as to those whose primary interest is the study of fixed point theory and the underlying spaces the level of exposition is directed to a wide audience including students and established researchers

Handbook of Metric Fixed Point Theory

2013-04-17

a relaxation based approach to optimal control of hybrid and switched systems proposes a unified approach to effective and numerically tractable relaxation schemes for optimal control problems of hybrid and switched systems the book gives an overview of the existing conventional and newly developed relaxation techniques associated with the conventional systems described by ordinary differential equations next it constructs a self contained relaxation theory for optimal control processes governed by various types sub classes of general hybrid and switched systems it contains all mathematical tools necessary for an adequate understanding and using of the sophisticated relaxation techniques in addition readers will find many practically oriented optimal control problems related to the new class of dynamic systems all in all the book follows engineering and numerical concepts however it can also be considered as a mathematical compendium that contains the necessary formal results and important algorithms related to the modern relaxation theory illustrates the use of the relaxation approaches in engineering optimization presents application of the relaxation methods in computational schemes for a numerical treatment of the sophisticated hybrid switched optimal control problems offers a rigorous and self contained mathematical tool for an adequate understanding and practical use of the relaxation techniques presents an extension of the relaxation methodology to the new class of applied dynamic systems namely to hybrid and switched control systems

A Relaxation-Based Approach to Optimal Control of Hybrid and Switched Systems

2019-02-14

this text provides a complete introduction to the theory of variational inequalities with emphasis on contact mechanics it covers existence uniqueness and convergence results for variational inequalities including the modelling and variational analysis of specific frictional contact problems with elastic viscoelastic and viscoplastic materials new models of contact are presented including contact of piezoelectric materials particular attention is paid to the study of history dependent quasivariational inequalities and to their applications in the study of contact problems with unilateral constraints the book fully illustrates the cross fertilisation between modelling and applications on the one hand and nonlinear mathematical analysis on the other indeed the reader will gain an understanding of how new and nonstandard models in contact mechanics lead to new types of variational inequalities and conversely how abstract results concerning variational inequalities can be applied to prove the unique solvability of the corresponding contact problems

Mathematical Models in Contact Mechanics

2012-09-13

this book provides an extensive introduction to the numerical solution of a large class of integral equations

The Numerical Solution of Integral Equations of the Second Kind

1997-06-28

the book is highly recommended as a text for an introductory course in nonlinear analysis and bifurcation theory reading is fluid and very pleasant style is informal but far from being imprecise review of the first edition new to this edition additional applications of the theory and techniques as well as several new proofs this book is ideal for self study for mathematicians and students interested in geometric and algebraic topology functional analysis differential equations and applied mathematics

A Topological Introduction to Nonlinear Analysis

2013-04-17

nonlinear elliptic problems play an increasingly important role in mathematics science and engineering creating an exciting interplay between the subjects this is the first and only book to prove in a systematic and unifying way stability convergence and computing results for the different numerical methods for nonlinear elliptic problems the proofs use linearization compact perturbation of the coercive principal parts or monotone operator techniques and approximation theory examples are given for linear to fully nonlinear problems highest derivatives occur nonlinearly and for the most important space discretization methods conforming and nonconforming finite element discontinuous galerkin finite difference wavelet and in a volume to follow spectral and meshfree methods a number of specific long open problems are solved here numerical methods for fully nonlinear elliptic problems wavelet and meshfree methods for nonlinear problems and more general nonlinear boundary conditions we apply it to all these problems and methods in particular to eigenvalues monotone operators quadrature approximations and newton methods adaptivity is discussed for finite element and wavelet methods the book has been written for graduate students and scientists who want to study and to numerically analyze nonlinear elliptic differential equations in mathematics science and engineering it can be used as material for graduate courses or advanced seminars

Numerical Methods for Nonlinear Elliptic Differential Equations

2010-10-07

differential algebraic equations daes including so called descriptor systems began to attract significant research interest in applied and numerical mathematics in the early 1980s no more than about three decades ago in this relatively short time daes have become a widely acknowledged tool to model processes subjected to constraints in order to simulate and to control processes in various application fields such as network simulation chemical kinematics mechanical engineering system biology daes and their more abstract versions in infinite dimensional spaces comprise a great potential for future mathematical modeling of complex coupled processes the purpose of the book is to expose the impressive complexity of general daes from an analytical point of view to describe the state of the art as well as open problems and so to motivate further research to this versatile extra ordinary topic from a broader mathematical perspective the book elaborates a new general structural analysis capturing linear and nonlinear daes in a hierarchical way the dae structure is exposed by means of special projector functions numerical integration issues and computational aspects are treated also in this context

Differential-Algebraic Equations: A Projector Based Analysis

2013-01-19

and god said let there be light and there was light genesis 1 3 light is not only the basis of our biological existence but also an essential source of our knowledge about the physical laws of nature ranging from the seventeenth century geometrical optics up to the twentieth century theory of general relativity and quantum electrodynamics folklore don t give us numbers give us insight a contemporary natural scientist to a mathematician the present book is the second volume of a comprehensive introduction to themathematicalandphysicalaspectsofmodernquantum eldtheorywhich comprehends the following six volumes volume i basics in mathematics and physics volume ii quantum electrodynamics volume iii gauge theory volume iv quantum mathematics volume v the physics of the standard model volume vi quantum gravitation and string theory it is our goal to build a bridge between mathematicians and physicists based on the challenging question about the fundamental forces in macrocosmos the universe and microcosmos the world of elementary particles the six volumes address a broad audience of readers including both und graduate and graduate students as well as experienced scientists who want to become familiar with quantum eld theory which is a fascinating topic in modern mathematics and physics

Quantum Field Theory II: Quantum Electrodynamics

2008-09-03

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2018-02-23

this research monograph represents an outcome of the cross fertilization between nonlinear functional analysis and mathematical modelling and demonstrates its application to solid and contact mechanics based on authors original results it introduces a general fixed point principle and its application to various nonlinear problems in analysis and mechanics the classes of history dependent

operators and almost history dependent operators are exposed in a large generality a systematic and unified presentation contains a carefully selected collection of new results on variational hemivariational inequalities with or without unilateral constraints a wide spectrum of static quasistatic dynamic contact problems for elastic viscoelastic and viscoplastic materials illustrates the applicability of these theoretical results written for mathematicians applied mathematicians engineers and scientists it is also a valuable tool for graduate students and researchers in nonlinear analysis mathematical modelling mechanics of solids and contact mechanics

Variational-Hemivariational Inequalities with Applications

2017-10-23

this book provides a comprehensive analysis of the existence of weak solutions of unsteady problems with variable exponents the central motivation is the weak solvability of the unsteady p navier stokes equations describing the motion of an incompressible electro rheological fluid due to the variable dependence of the power law index p in this system the classical weak existence analysis based on the pseudo monotone operator theory in the framework of bochner lebesgue spaces is not applicable as a substitute for bochner lebesgue spaces variable bochner lebesgue spaces are introduced and analyzed in the mathematical framework of this substitute the theory of pseudo monotone operators is extended to unsteady problems with variable exponents leading to the weak solvability of the unsteady p navier stokes equations under general assumptions aimed primarily at graduate readers the book develops the material step by step starting with the basics of pde theory and non linear functional analysis the concise introductions at the beginning of each chapter together with illustrative examples graphics detailed derivations of all results and a short summary of the functional analytic prerequisites will ease newcomers into the subject

Pseudo-Monotone Operator Theory for Unsteady Problems with Variable Exponents

2023-09-12

this monograph offers a self contained introduction to pseudodifferential operators and wavelets over real and p adic fields aimed at graduate students and researchers interested in harmonic analysis over local fields the topics covered in this book include pseudodifferential operators of principal type and of variable order semilinear degenerate pseudodifferential boundary value problems bvps non classical pseudodifferential bvps wavelets and hardy spaces wavelet integral operators and wavelet solutions to cauchy problems over the real field and the p adic field

Pseudodifferential Operators and Wavelets over Real and p-adic Fields

2018-11-28

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