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on Complex Manifolds Asymptotic Behavior of Dissipative Systems The Princeton Companion to Mathematics Spectral Theory The Interplay between Differential Geometry and Differential Equations Oscillations in Nonlinear Systems Nonlinear Potential Theory and Quasiregular Mappings on Riemannian Manifolds Manifolds and Differential Geometry

An Introduction to Manifolds

2010-10-05

manifolds the higher dimensional analogs of smooth curves and surfaces are fundamental objects in modern mathematics combining aspects of algebra topology and analysis manifolds have also been applied to classical mechanics general relativity and quantum field theory in this streamlined introduction to the subject the theory of manifolds is presented with the aim of helping the reader achieve a rapid mastery of the essential topics by the end of the book the reader should be able to compute at least for simple spaces one of the most basic topological invariants of a manifold its de rham cohomology along the way the reader acquires the knowledge and skills necessary for further study of geometry and topology the requisite point set topology is included in an appendix of twenty pages other appendices review facts from real analysis and linear algebra hints and solutions are provided to many of the exercises and problems this work may be used as the text for a one semester graduate or advanced undergraduate course as well as by students engaged in self study requiring only minimal undergraduate prerequisites introduction to manifolds is also an excellent foundation for springer s gtm 82 differential forms in algebraic topology

Introductory Lectures on Equivariant Cohomology

2020-03-03

this book gives a clear introductory account of equivariant cohomology a central topic in algebraic topology equivariant cohomology is concerned with the algebraic topology of spaces with a group action or in other words with symmetries of spaces first defined in the 1950s it has been introduced into k theory and algebraic geometry but it is in algebraic topology that the concepts are the most transparent and the proofs are the simplest one of the most useful applications of equivariant cohomology is the equivariant localization theorem of atiyah bott and berline vergne which converts the integral of an equivariant differential form into a finite sum over the fixed point set of the group action providing a powerful tool for computing integrals over a manifold because integrals and symmetries are ubiquitous equivariant cohomology has found applications in diverse areas of mathematics and physics assuming readers have taken one semester of manifold theory and a year of algebraic topology loring tu begins with the topological construction of equivariant cohomology then develops the theory for smooth manifolds with the aid of differential forms to keep the exposition simple the equivariant localization theorem is proven only for a circle action an appendix gives a proof of the equivariant de rham theorem demonstrating that equivariant cohomology can be computed using equivariant differential forms examples and calculations illustrate new concepts exercises include hints or solutions making this book suitable for self study

Manifolds, Tensor Analysis, and Applications

1993-08-13

the purpose of this book is to provide core material in nonlinear analysis for mathematicians physicists engineers and mathematical biologists the main goal is to provide a working knowledge of manifolds dynamical systems tensors and differential forms some applications to hamiltonian mechanics fluid me chanics electromagnetism plasma dynamics and control thcory arc given in chapter 8 using both invariant and index notation the current edition of the book does not deal with riemannian geometry in much detail and it does not treat lie groups principal bundles or morse theory some of this is planned for a subsequent edition meanwhile the authors will make available to interested readers supplementary chapters on lie groups and differential topology and invite comments on the book s contents and development throughout the text supplementary topics are given marked with the symbols and l j this device enables the reader to skip various topics without disturbing the main flow of the text some of these provide additional background material intended for completeness to minimize the necessity of consulting too many outside references we treat finite and infinite dimensional manifolds simultaneously this is partly for efficiency of exposition without advanced applications using manifolds of mappings the study of infinite dimensional manifolds can be hard to motivate

Recipes for Continuation

2013-08-08

this book provides a comprehensive introduction to the mathematical methodology of parameter continuation it develops a systematic formalism for constructing and implementing abstract representations of continuation problems with equal emphasis on theoretical rigor algorithm development and software engineering the book demonstrates the use of fully developed toolbox templates for boundary value problems to the analysis of periodic orbits quasi periodic invariant tori and connecting orbits between equilibria and or periodic orbits the book contains extensive and fully worked examples that illustrate the application of the matlab based computational continuation core coco to cutting edge research in applied dynamical systems many exercises and open ended projects on both theoretical and algorithmic aspects of the material are provided suitable for self study and course assignments it is intended for students and teachers of nonlinear dynamics and engineering at the advanced undergraduate or first year graduate level as well as practitioners engaged in modeling dynamical systems or software development

Type II Blow Up Manifolds for the Energy

Supercritical Semilinear Wave Equation

2018-03-19

our analysis adapts the robust energy method developed for the study of energy critical bubbles by merle rapha el rodnianski rapha el rodnianski and rapha el schweyer the study of this issue for the supercritical semilinear heat equation done by herrero vel azquez matano merle and mizoguchi and the analogous result for the energy supercritical schr odinger equation by merle rapha el rodnianski

An Introductory Course on Differentiable Manifolds

2017-03-23

based on author siavash shahshahani s extensive teaching experience this volume presents a thorough rigorous course on the theory of differentiable manifolds geared toward advanced undergraduates and graduate students in mathematics the treatment s prerequisites include a strong background in undergraduate mathematics including multivariable calculus linear algebra elementary abstract algebra and point set topology more than 200 exercises offer students ample opportunity to gauge their skills and gain additional insights the four part treatment begins with a single chapter devoted to the tensor algebra of linear spaces and their mappings part ii brings in neighboring points to explore integrating vector fields lie bracket exterior

derivative and lie derivative part iii involving manifolds and vector bundles develops the main body of the course the final chapter provides a glimpse into geometric structures by introducing connections on the tangent bundle as a tool to implant the second derivative and the derivative of vector fields on the base manifold relevant historical and philosophical asides enhance the mathematical text and helpful appendixes offer supplementary material

Advanced Topics in the Theory of Dynamical Systems

2016-06-03

advanced topics in the theory of dynamical systems covers the proceedings of the international conference by the same title held at villa madruzzo trento italy on june 1 6 1987 the conference reviews research advances in the field of dynamical systems this book is composed of 20 chapters that explore the theoretical aspects and problems arising from applications of these systems considerable chapters are devoted to finite dimensional systems with special emphasis on the analysis of existence of periodic solutions to hamiltonian systems other chapters deal with infinite dimensional systems and the developments of methods in the general approach to existence and qualitative analysis problems in the general theory as well as in the study of particular systems concerning natural sciences the final chapters discuss the properties of hyperbolic sets equivalent period doubling cauchy problems and quasiperiodic solitons for nonlinear klein gordon equations this book is of value to mathematicians physicists researchers and advance students

Bifurcation of an Invariant Manifold from a Periodic Solution of a Differential System

1960

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1998-11-26

this book presents properties examples rigidity theorems and classification results of such finsler metrics in particular this book introduces how to investigate spherically symmetric finsler geometry using ode or pde methods spherically symmetric finsler geometry is a subject that concerns domains in r n with spherically symmetric metrics recently a significant progress has been made in studying riemannian finsler geometry however constructing nice examples of finsler metrics turn out to be very difficult in spherically symmetric finsler geometry we find many nice examples with special curvature properties using pde technique the studying of spherically symmetric geometry shows closed relation among geometry group and equation

The Geometry of Spherically Symmetric Finsler Manifolds

2018-09-21

an accessible introduction to the intersection theory of punctured holomorphic curves and its applications in topology

Lectures on Contact 3-Manifolds, Holomorphic Curves and Intersection Theory

2020-03-26

celebrating the work of renowned mathematician jerome a goldstein this reference compiles original research on the theory and application of evolution equations to stochastics physics engineering biology and finance the text explores a wide range of topics in linear and nonlinear semigroup theory operator theory functional analysis and li

Evolution Equations

2019-04-24

the book covers the latest research in the areas of mathematics that deal the properties of partial differential equations and stochastic processes on spaces in connection with the geometry of the underlying space written by experts in the field this book is a valuable tool for the advanced mathematician

Analysis and Partial Differential Equations on Manifolds, Fractals and Graphs

2021-01-18

this contributed volume showcases research and survey papers devoted to a broad range of topics on functional equations ordinary differential equations partial differential equations stochastic differential equations optimization theory network games generalized nash equilibria critical point theory calculus of variations nonlinear functional analysis convex analysis variational inequalities topology global differential geometry curvature flows perturbation theory numerical analysis mathematical finance and a variety of applications in interdisciplinary topics chapters in this volume investigate compound superquadratic functions the hyers ulam stability of functional equations edge degenerate pseudo hyperbolic equations kirchhoff wave equation bmo norms of operators on differential forms equilibrium points of the perturbed r3bp complex zeros of solutions to second order differential equations a higher order ginzburg landau type equation multi symplectic numerical schemes for differential equations the erdős rényi network model

strongly m convex functions higher order strongly generalized convex functions factorization and solution of second order differential equations generalized topologically open sets in relator spaces graphical mean curvature flow critical point theory in infinite dimensional spaces using the leray schauder index non radial solutions of a supercritical equation in expanding domains the semi discrete method for the approximation of the solution of stochastic differential equations homotopic metric interval l contractions in gauge spaces rhoades contractions theory network centrality measures the radon transform in three space dimensions via plane integration and applications in positron emission tomography boundary perturbations on medical monitoring and imaging techniques the kdv b equation and biomedical applications

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1996

this book represents a novel approach to differential topology its main focus is to give a comprehensive introduction to the classification of manifolds with special attention paid to the case of surfaces for which the book provides a complete classification from many points of view topological smooth constant curvature complex and conformal each chapter briefly revisits basic results usually known to graduate students from an alternative perspective focusing on surfaces we provide full proofs of some remarkable results that sometimes are missed in basic courses e g the construction of

triangulations on surfaces the classification of surfaces the gauss bonnet theorem the degree genus formula for complex plane curves the existence of constant curvature metrics on conformal surfaces and we give hints to questions about higher dimensional manifolds many examples and remarks are scattered through the book each chapter ends with an exhaustive collection of problems and a list of topics for further study the book is primarily addressed to graduate students who did take standard introductory courses on algebraic topology differential and riemannian geometry or algebraic geometry but have not seen their deep interconnections which permeate a modern approach to geometry and topology of manifolds

Nonlinear Analysis, Differential Equations, and Applications

2021-08-20

the present book builds upon an earlier work of j hale theory of func tional differential equations published in 1977 we have tried to maintain the spirit of that book and have retained approximately one third of the material intact one major change was a complete new presentation of lin ear systems chapters 6 9 for retarded and neutral functional differential equations the theory of dissipative systems chapter 4 and global at tractors was completely revamped as well as the invariant manifold theory chapter 10 near equilibrium points and periodic orbits a more complete theory of neutral equations is presented see chapters 1 2 3 9 and 10 chapter 12 is completely new and contains a guide

to active topics of re search in the sections on supplementary remarks we have included many references to recent literature but of course not nearly all because the subject is so extensive jack k hale sjoerd m verduyn lunel contents preface v introduction 1 1 linear differential difference equations 11 1 1 differential and difference equations 11 1 2 retarded differential difference equations 13 1 3 exponential estimates of x f 15 1 4 the characteristic equation 17 1 5 the fundamental solution 18 1 6 the variation of constants formula 23 1 7 neutral differential difference equations 25 1 8 supplementary remarks 34 2 functional differential equations basic theory 38 2 1 definition of a retarded equation 38 2 2 existence uniqueness and continuous dependence 39 2 3 continuation of solutions 44

Geometry and Topology of Manifolds: Surfaces and Beyond

2020-10-21

manifolds the higher dimensional analogs of smooth curves and surfaces are fundamental objects in modern mathematics combining aspects of algebra topology and analysis manifolds have also been applied to classical mechanics general relativity and quantum field theory in this streamlined introduction to the subject the theory of manifolds is presented with the aim of helping the reader achieve a rapid mastery of the essential topics by the end of the book the reader should be able to compute at least for simple spaces one of the most basic topological invariants of a manifold its de rham cohomology

along the way the reader acquires the knowledge and skills necessary for further study of geometry and topology the requisite point set topology is included in an appendix of twenty pages other appendices review facts from real analysis and linear algebra hints and solutions are provided to many of the exercises and problems this work may be used as the text for a one semester graduate or advanced undergraduate course as well as by students engaged in self study requiring only minimal undergraduate prerequisites introduction to manifolds is also an excellent foundation for springer s gtm 82 differential forms in algebraic topology

Introduction to Functional Differential Equations

1993-10-14

this volume contains some of the lectures presented in june 1994 during the ams siam summer seminar at the mathematical sciences research institute in berkeley the goal of the seminar was to introduce participants to as many interesting and active applications of dynamical systems and probabilistic methods to problems in applied mathematics as possible as a result this book covers a great deal of ground nevertheless the pedagogical orientation of the lectures has been retained and therefore the book will serve as an ideal introduction to these varied and interesting topics

An Introduction to Manifolds

2010-10-05

over the last number of years powerful new methods in analysis and topology have led to the development of the modern global theory of symplectic topology including several striking and important results the first edition of introduction to symplectic topology was published in 1995 the book was the first comprehensive introduction to the subject and became a key text in the area a significantly revised second edition was published in 1998 introducing new sections and updates on the fast developing area this new third edition includes updates and new material to bring the book right up to date

Dynamical Systems and Probabilistic Methods in Partial Differential Equations

1996

differential algebraic equations are a widely accepted tool for the modeling and simulation of constrained dynamical systems in numerous applications such as mechanical multibody systems electrical circuit simulation chemical engineering control theory fluid dynamics and many others this is the first comprehensive textbook that provides a systematic and detailed analysis of initial and boundary value problems for differential algebraic equations the

analysis is developed from the theory of linear constant coefficient systems via linear variable coefficient systems to general nonlinear systems further sections on control problems generalized inverses of differential algebraic operators generalized solutions and differential equations on manifolds complement the theoretical treatment of initial value problems two major classes of numerical methods for differential algebraic equations runge kutta and bdf methods are discussed and analyzed with respect to convergence and order a chapter is devoted to index reduction methods that allow the numerical treatment of general differential algebraic equations the analysis and numerical solution of boundary value problems for differential algebraic equations is presented including multiple shooting and collocation methods a survey of current software packages for differential algebraic equations completes the text the book is addressed to graduate students and researchers in mathematics engineering and sciences as well as practitioners in industry a prerequisite is a standard course on the numerical solution of ordinary differential equations numerous examples and exercises make the book suitable as a course textbook or for self study

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2016-01-30

nonlinear dynamics of complex processes is an active research field with large numbers of publications in basic research and broad applications from diverse fields of science nonlinear dynamics as manifested by deterministic

and stochastic evolution models of complex behavior has entered statistical physics physical chemistry biophysics geophysics astrophysics theoretical ecology semiconductor physics and optics etc this field of research has induced a new terminology in science connected with new questions problems solutions and methods new scenarios have emerged for spatio temporal structures in dynamical systems far from equilibrium their analysis and possible control are intriguing and challenging aspects of the current research the duality of fundamental and applied research is a focal point of its main attractivity and fascination basic topics and foundations are always linked to concrete and precise examples models and measurements of complex nonlinear processes evoke and provoke new fundamental questions that diversify and broaden the mathematical concepts and tools in return new mathematical approaches to modeling and analysis enlarge the scope and efficiency of applied research

Introduction to Symplectic Topology

2017-03-16

an extension of different lectures given by the authors local bifurcations center manifolds and normal forms in infinite dimensional dynamical systems provides the reader with a comprehensive overview of these topics starting with the simplest bifurcation problems arising for ordinary differential equations in one and two dimensions this book describes several tools from the theory of infinite dimensional dynamical systems allowing the reader to

treat more complicated bifurcation problems such as bifurcations arising in partial differential equations attention is restricted to the study of local bifurcations with a focus upon the center manifold reduction and the normal form theory two methods that have been widely used during the last decades through use of step by step examples and exercises a number of possible applications are illustrated and allow the less familiar reader to use this reduction method by checking some clear assumptions written by recognised experts in the field of center manifold and normal form theory this book provides a much needed graduate level text on bifurcation theory center manifolds and normal form theory it will appeal to graduate students and researchers working in dynamical system theory

Differential-algebraic Equations

2006

this monograph contains papers that were delivered at the special session on geometric potential analysis that was part of the mathematical congress of the americas 2021 virtually held in buenos aires the papers that were contributed by renowned specialists worldwide cover important aspects of current research in geometrical potential analysis and its applications to partial differential equations and mathematical physics

Analysis and Control of Complex Nonlinear Processes in Physics, Chemistry and Biology

2007

this volume brings together a comprehensive selection of over fifty reprints on the theory and applications of chaotic oscillators included are fundamental mathematical papers describing methods for the investigation of chaotic behavior in oscillatory systems as well as the most important applications in physics and engineering there is currently no book similar to this collection contents chaos before chaos frequency demultiplication b van der pol j van der mark description and quantification of chaotic behavior geometry from a time series n h packard et al analytical methods a partial differential equation with infinitely many periodic orbits chaotic oscillations of a forced beam p holmes j marsden classical nonlinear oscillators duffing van der pol and pendulum universal scaling property in bifurcation structure of duffing s and generalized duffing s equations s sato et al other oscillatory systems complex dynamics of compliant off shore structures j m t thompson chaos in noisy systems fluctuations and the onset of chaos j p crutchfield b a huberman strange nonchaotic attractors dimensions of strange nonchaotic attractors m ding et al spatial chaos chaos as a limit in a boundary value problem c kahlert o e rössler fractal basin boundaries fractal basin boundaries and homoclinic orbit for periodic motion in a two well potential f c moon g h li and other papers readership nonlinear scientists applied mathematicians engineers and physicists keywords

Local Bifurcations, Center Manifolds, and Normal Forms in Infinite-Dimensional Dynamical Systems

2010-11-23

this graduate level introduction to ordinary differential equations combines both qualitative and numerical analysis of solutions in line with poincaré s vision for the field over a century ago taking into account the remarkable development of dynamical systems since then the authors present the core topics that every young mathematician of our time pure and applied alike ought to learn the book features a dynamical perspective that drives the motivating questions the style of exposition and the arguments and proof techniques the text is organized in six cycles the first cycle deals with the foundational questions of existence and uniqueness of solutions the second introduces the basic tools both theoretical and practical for treating concrete problems the third cycle presents autonomous and non autonomous linear theory lyapunov stability theory forms the fourth cycle the fifth one deals with the local theory including the grobman hartman theorem and the stable manifold theorem the last cycle discusses global issues in the broader setting of differential equations on manifolds culminating in the poincaré hopf index theorem the book is appropriate for use in a course or for self study the reader is assumed to have a basic knowledge of general topology linear algebra and analysis at the undergraduate level each chapter ends with a computational experiment a diverse list of exercises and detailed historical biographical and bibliographic notes seeking to help the reader

form a clearer view of how the ideas in this field unfolded over time

Geometric Potential Analysis

2022-06-21

this book is an introduction to the theory of complex manifolds and their deformations deformation of the complex structure of riemann surfaces is an idea which goes back to riemann who in his famous memoir on abelian functions published in 1857 calculated the number of effective parameters on which the deformation depends since the publication of riemann s memoir questions concerning the deformation of the complex structure of riemann surfaces have never lost their interest the deformation of algebraic surfaces seems to have been considered first by max noether in 1888 m noether anzahl der modulen einer classe algebraischer fliichen sitz k6niglich preuss akad der wiss zu berlin erster halbband 1888 pp 123 127 however the deformation of higher dimensional complex manifolds had been curiously neglected for 100 years in 1957 exactly 100 years after riemann s memoir frolicher and nijenhuis published a paper in which they studied deformation of higher dimensional complex manifolds by a differential geometric method and obtained an important result a fr61icher and a nijenhuis a theorem on stability of complex structures proc nat acad sci u s a 43 1957 239 241

An Introduction to Dynamical Systems and Chaos

1992-11-30

this largely self contained research monograph addresses the following type of questions suppose one encounters a continuous time dynamical system with some built in symmetry should one expect periodic motions which somehow reflect this symmetry and how would periodicity harmonize with symmetry probing into these questions leads from dynamics to topology algebra singularity theory and to many applications within a global approach the emphasis is on periodic motions far from equilibrium mathematical methods include bifurcation theory transversality theory and generic approximations a new homotopy invariant is designed to study the global interdependence of symmetric periodic motions besides mathematical techniques the book contains 5 largely nontechnical chapters the first three outline the main questions results and methods a detailed discussion pursues theoretical consequences and open problems results are illustrated by a variety of applications including coupled oscillators and rotating waves these links to such disciplines as theoretical biology chemistry fluid dynamics physics and their engineering counterparts make the book directly accessible to a wider audience

Chaotic Oscillators

2021-12-07

analytical and numerical approaches to asymptotic problems in analysis

Differential Equations

2012-12-06

this text focuses on developing an intimate acquaintance with the geometric meaning of curvature and thereby introduces and demonstrates all the main technical tools needed for a more advanced course on riemannian manifolds it covers proving the four most fundamental theorems relating curvature and topology the gauss bonnet theorem the cartan hadamard theorem bonnet s theorem and a special case of the cartan ambrose hicks theorem

Complex Manifolds and Deformation of Complex Structures

2006-11-14

the present monograph is devoted to the complex theory of differential equations not yet a handbook neither a simple collection of articles the book

is a first attempt to present a more or less detailed exposition of a young but promising branch of mathematics that is the complex theory of partial differential equations let us try to describe the framework of this theory first simple examples show that solutions of differential equations are as a rule ramifying analytic functions and hence are not regular near points of their ramification second bearing in mind these important properties of solutions we shall try to describe the method solving our problem surely one has first to consider differential equations with constant coefficients the apparatus solving such problems is well known in the real the ory of differential equations this is the fourier transformation un fortunately such a transformation had not yet been constructed for complex analytic functions and the authors had to construct by them selves this transformation is of course the key notion of the whole theory

Global Bifurcation of Periodic Solutions with Symmetry

2010-07-03

this monograph reports the advances that have been made in the area by the author and many other mathematicians it is an important source of ideas for the researchers interested in the subject zentralblatt math although advanced this book is a very good introduction to the subject and the reading of the abstract part which is elegant is pleasant this monograph will be of valuable interest for those who aim to learn in the very rapidly growing subject of

infinite dimensional dissipative dynamical systems mathematical reviews this book is directed at researchers in nonlinear ordinary and partial differential equations and at those who apply these topics to other fields of science about one third of the book focuses on the existence and properties of the flow on the global attractor for a discrete or continuous dynamical system the author presents a detailed discussion of abstract properties and examples of asymptotically smooth maps and semigroups he also covers some of the continuity properties of the global attractor under perturbation its capacity and hausdorff dimension and the stability of the flow on the global attractor under perturbation the remainder of the book deals with particular equations occurring in applications and especially emphasizes delay equations reaction diffusion equations and the damped wave equations in each of the examples presented the author shows how to verify the existence of a global attractor and for several examples he discusses some properties of the flow on the global attractor

Analytical and Numerical Approaches to Asymptotic Problems in Analysis

2006-04-06

this is a one of a kind reference for anyone with a serious interest in mathematics edited by timothy gowers a recipient of the fields medal it presents nearly two hundred entries written especially for this book by some of the world s leading mathematicians that introduce basic mathematical tools

and vocabulary trace the development of modern mathematics explain essential terms and concepts examine core ideas in major areas of mathematics describe the achievements of scores of famous mathematicians explore the impact of mathematics on other disciplines such as biology finance and music and much much more unparalleled in its depth of coverage the princeton companion to mathematics surveys the most active and exciting branches of pure mathematics accessible in style this is an indispensable resource for undergraduate and graduate students in mathematics as well as for researchers and scholars seeking to understand areas outside their specialties features nearly 200 entries organized thematically and written by an international team of distinguished contributors presents major ideas and branches of pure mathematics in a clear accessible style defines and explains important mathematical concepts methods theorems and open problems introduces the language of mathematics and the goals of mathematical research covers number theory algebra analysis geometry logic probability and more traces the history and development of modern mathematics profiles more than ninety five mathematicians who influenced those working today explores the influence of mathematics on other disciplines includes bibliographies cross references and a comprehensive index contributors incude graham allan noga alon george andrews tom archibald sir michael atiyah david aubin joan bagaria keith ball june barrow green alan beardon david d ben zvi vitaly bergelson nicholas bingham béla bollobás henk bos bodil branner martin r bridson john p burgess kevin buzzard peter j cameron jean luc chabert eugenia cheng clifford c cocks alain connes leo corry wolfgang coy tony crilly serafina cuomo mihalis dafermos partha dasgupta ingrid daubechies joseph w dauben john w dawson jr francois de gandt persi diaconis jordan s ellenberg lawrence c evans florence

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Riemannian Manifolds

2013-03-09

this textbook offers a concise introduction to spectral theory designed for newcomers to functional analysis curating the content carefully the author builds to a proof of the spectral theorem in the early part of the book subsequent chapters illustrate a variety of application areas exploring key examples in detail readers looking to delve further into specialized topics will find ample references to classic and recent literature beginning with a brief introduction to functional analysis the text focuses on unbounded operators and separable hilbert spaces as the essential tools needed for the subsequent theory a thorough discussion of the concepts of spectrum and resolvent follows leading to a complete proof of the spectral theorem for unbounded self adjoint operators applications of spectral theory to differential operators comprise the remaining four chapters these chapters introduce the dirichlet laplacian operator schrödinger operators operators on graphs and the spectral theory of riemannian manifolds spectral theory offers a uniquely accessible introduction to ideas that invite further study in any number of different directions a background in real and complex analysis is assumed the author presents the requisite tools from functional analysis within the text this introductory treatment would suit a functional analysis course intended as a pathway to linear pde theory independent later chapters allow for flexibility in selecting applications to suit specific interests within a one semester course

Differential Equations on Complex Manifolds

2010-01-04

by focusing on ordinary differential equations that contain a small parameter this concise graduate level introduction provides a unified approach for obtaining periodic solutions to nonautonomous and autonomous differential equations 1963 edition

Asymptotic Behavior of Dissipative Systems

2010-07-18

differential geometry began as the study of curves and surfaces using the methods of calculus this book offers a graduate level introduction to the tools and structures of modern differential geometry it includes the topics usually found in a course on differentiable manifolds such as vector bundles tensors and de rham cohomology

The Princeton Companion to Mathematics

2020-03-12

Spectral Theory

1995

The Interplay between Differential Geometry and Differential Equations

2015-03-24

Oscillations in Nonlinear Systems

1990

Nonlinear Potential Theory and Quasiregular Mappings on Riemannian Manifolds

2009

Manifolds and Differential Geometry

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