Differential Equations With De Tools Printed Access Card 4th Fourth Edition By Blanchard Paul Devaney Robert L Hall Glen R Published By Cengage Learning 2011 | dca55b908521bf221ca47b0b0cbe6957

Ordinary Differential Equations and Dynamical SystemsDifferential Equations with Applications and Historical NotesFractional-Order Control SystemsDifferential Equations, Binder Ready VersionLinear Algebra and Differential EquationsDe Tool to Accompany Zill A First Course in Differential Equations with Modeling Applications, 8E [and] ZillDifferential Equations, Dynamical Systems, and an Introduction to ChaosNumerical Solution of Partial Differential Equations: Theory, Tools and Case StudiesVariational Techniques for Elliptic Partial Differential EquationsSolving Ordinary Differential Equations IIDifferential Equations & Linear AlgebraSolving Ordinary Differential Equations IIntroduction to Partial Differential EquationsOrdinary Differential EquationsApplied Stochastic Differential EquationsA First Course in Differential Equations with Modeling ApplicationsDifferential Equations with Maple V®Analytic Tools for Feynman IntegralsTools and Problems in Partial Differential EquationsComputational PhysicsPeriodic Differential Equations in the PlaneFundamentals of Differential EquationsDifferential Equations with Boundary-value ProblemsFourier Analysis and Nonlinear Partial Differential EquationsDifferential EquationsDifferential Dynamical Systems, Revised EditionDifferential EquationsMathematical Tools for the Study of the Incompressible Navier-Stokes Equations and Related ModelsOptimal Control of ODEs and DAEsOrdinary Differential EquationsTheory and Applications of Fractional Differential EquationsDifferential EquationsOrdinary Differential EquationsSolving Differential Equations in RDifferential Equations Driven by Rough PathsActive CalculusFunctional Analysis, Sobolev Spaces and Partial Differential EquationsDifferential EquationsMastering Differential EquationsComputational Differential Equations

Ordinary Differential Equations and Dynamical Systems The intention of this textbook is to provide both, the theoretical and computational tools that are necessary to investigate and to solve optimal control problems with ordinary differential equations and differential-algebraic equations. An emphasis is placed on the interplay between the continuous optimal control problem, which typically is defined and analyzed in a Banach space setting, and discrete optimal control problems, which are obtained by discretization and lead to finite dimensional optimization problems.

Differential Equations with Applications and Historical Notes This package (book + CD-ROM) has been replaced by the ISBN 0321388410 (which consists of the book alone). The material that was on the CD-ROM is available for download at http://aw-bc.com/nss Fundamentals of Differential Equations presents the basic theory of differential equations and offers a variety of modern applications in science and engineering. Available in two versions, these flexible texts offer the instructor many choices in syllabus design, course emphasis (theory, methodology, applications, and numerical methods), and in using commercially available computer software. Fundamentals of Differential Equations, Seventh Edition is suitable for a one-semester sophomore- or junior-level course. Fundamentals of Differential Equations with Boundary Value Problems, Fifth Edition, contains enough material for a two-semester course that covers and builds on boundary value problems. The Boundary Value Problems version consists of the main text plus three additional chapters (Eigenvalue Problems and Sturm-Liouville Equations; Stability of Autonomous Systems; and Existence and Uniqueness Theory).

Fractional-Order Control Systems The objective of this self-contained book is two-fold. First, the reader is introduced to the modelling and mathematical analysis used in fluid mechanics, especially concerning the Navier-Stokes equations which is the basic model for the flow of incompressible viscous fluids. Authors introduce mathematical tools so that the reader is able to use them for studying many other kinds of partial differential equations, in particular nonlinear evolution problems. The background needed are basic results in calculus, integration, and functional analysis. Some sections certainly contain more advanced topics than others. Nevertheless, the authors' aim is that graduate or PhD students, as well as researchers who are not specialized in nonlinear analysis or in mathematical fluid mechanics, can find a detailed introduction to this subject. .

Differential Equations, Binder Ready Version

Linear Algebra and Differential Equations A FIRST COURSE IN DIFFERENTIAL EQUATIONS WITH MODELING APPLICATIONS, 10th Edition strikes a balance between the analytical, qualitative, and quantitative approaches to the study of differential equations. This proven and accessible text speaks to beginning engineering and math students through a wealth of pedagogical aids, including an abundance of examples, explanations, Remarks boxes, definitions, and group projects. Written in a straightforward, readable, and helpful style, this book provides a thorough treatment of boundary-value problems and partial differential equations. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version.

De Tool to Accompany Zill A First Course in Differential Equations with Modeling Applications, 8E [and] Zill Differential equations are the basis for models of any physical systems that exhibit smooth change. This book combines much of the material found in a traditional course on ordinary differential equations with an introduction to the more modern theory of dynamical systems. Applications of this theory to physics, biology, chemistry, and engineering are shown through examples in such areas as population modeling, fluid dynamics, electronics, and mechanics.? Differential Dynamical Systems begins with coverage of linear systems, including matrix algebra; the focus then shifts to foundational material on nonlinear differential equations, making heavy use of the contraction-mapping theorem. Subsequent chapters deal specifically with dynamical systems concepts?flow, stability, invariant manifolds, the phase plane, bifurcation, chaos, and Hamiltonian dynamics. This new edition contains several important updates and revisions throughout the book. Throughout the book, the author includes exercises to help students develop an analytical and geometrical understanding of dynamics. Many of the exercises and examples are based on applications and some involve computation; an appendix offers simple codes written in Maple?, Mathematica?, and MATLAB? software to give students practice with computation applied to dynamical systems problems.

Differential Equations, Dynamical Systems, and an Introduction to Chaos This book explains the essentials of fractional calculus and demonstrates its application in control system modeling, analysis and design. It presents original research to find high-precision solutions to fractional-order differentiations and differential equations. Numerical algorithms and their implementations are proposed to analyze multivariable fractional-order control systems. Through high-quality MATLAB programs, it provides engineers and applied mathematicians with theoretical and numerical tools to design control systems. Contents Introduction to fractional calculus and fractional-order control Mathematical prerequisites Definitions and computation algorithms of fractional-order derivatives and Integrals Solutions of linear fractional-order differential equations Approximation of fractional-order operators Modelling and analysis of multivariable fractional-order transfer function Matrices State space modelling and analysis of linear fractional-order Systems Numerical solutions of nonlinear fractional-order differential Equations Design of fractional-order PID controllers Frequency domain controller design for multivariable fractional-order Systems Inverse Laplace transforms involving fractional and irrational Operations FOTF Toolbox functions and models Benchmark problems for the assessment of fractional-order differential equation algorithms

Numerical Solution of Partial Differential Equations: Theory, Tools and Case Studies Differential Equations with Maple V provides an introduction and discussion of topics typically covered in an undergraduate course in ordinary differential equations as well as some supplementary topics such as Laplace transforms, Fourier series, and partial differential equations. It also illustrates how Maple V is used to enhance the study of differential equations not only by eliminating the computational difficulties, but also by overcoming the visual limitations associated with the solutions of differential equations. The book contains chapters that present differential equations and illustrate how Maple V can be used to solve some typical problems. The text covers topics on differential equations such as first-order ordinary differential equations, higher order differential equations, power series solutions of ordinary differential equations, the Laplace Transform, systems of ordinary differential equations, and Fourier Series and applications to partial differential equations. Applications of these topics are also provided. Engineers, computer scientists, physical scientists, mathematicians, business professionals, and students will find the book useful.

Variational Techniques for Elliptic Partial Differential Equations For courses in Differential Equations and Linear Algebra . Concepts, methods, and core topics covering elementary differential equations and linear algebra through real-world applications In a contemporary introduction to differential equations and linear algebra, acclaimed authors Edwards and Penney combine core topics in elementary differential equations with concepts and methods of elementary linear algebra. Renowned for its real-world applications and blend of algebraic and geometric approaches, Differential Equations and Linear Algebra introduces you to mathematical modeling of real-world phenomena and offers the best problems sets in any differential equations and linear algebra textbook. The 4th Edition includes fresh new computational and qualitative flavor evident throughout in figures, examples, problems, and applications. Additionally, an Expanded Applications website containing expanded applications and programming tools is now available.

Solving Ordinary Differential Equations II Textbook for teaching computational mathematics.

Differential Equations & Linear Algebra Fads are as common in mathematics as in any other human activity, and it is always difficult to separate the enduring from the ephemeral in the achievements of one's own time. An unfortunate effect of the predominance of fads is that if a student doesn't learn about such worthwhile topics as the wave equation, Gauss's hypergeometric function, the gamma function, and the basic problems of the calculus of variations—among others—as an undergraduate, then he/she is unlikely to do so later. The natural place for an informal acquaintance with such ideas is a leisurely introductory course on differential equations. Specially designed for just such a course, Differential Equations with Applications and Historical Notes takes great pleasure in the journey into the world of differential equations and their wide range of applications. The author—a highly respected educator—advocates a careful approach, using explicit explanation to ensure students fully comprehend the subject matter. With an emphasis on modeling and applications, the long-awaited Third Edition of this classic textbook presents a substantial new section on Gauss's bell curve and improves coverage of Fourier analysis, numerical methods, and linear algebra. Relating the development of mathematics to human activity—i.e., identifying why and how mathematics is used—the text includes a wealth of unique examples and exercises, as well as the author's distinctive historical notes, throughout. Provides an ideal text for a one- or two-semester introductory course on differential equations Emphasizes modeling and applications Presents a substantial new section on Gauss's bell curve Improves coverage of Fourier analysis, numerical methods, and linear algebra Relates the development of mathematics to human activity—i.e., identifying why and how mathematics is used Includes a wealth of unique examples and exercises, as well as the author's distinctive historical notes, throughout Uses explicit explanation to ensure students fully comprehend the subject matter Outstanding Academic Title of the Year, Choice magazine, American Library Association.

Solving Ordinary Differential Equations I "Whatever regrets may be, we have done our best." (Sir Ernest Shackleton, turning back on 9 January 1909 at 88°23' South.) Brahms struggled for 20 years to write his first symphony. Compared to this, the 10 years we have been working on these two volumes may even appear short. This second volume treats stiff differential equations and differential alge braic equations. It contains three chapters: Chapter IV on one-step (Runge Kutta) methods for stiff problems, Chapter Von multistep methods for stiff problems, and Chapter VI on singular perturbation and differential-algebraic equations. Each chapter is divided into sections. Usually the first sections of a chapter are of an introductory nature, explain numerical phenomena and exhibit numerical results. Investigations of a more theoretieal nature are presented in the later sections of each chapter. As in Volume I, the formulas, theorems, tables and figures are numbered consecutively in each section and indicate, in addition, the section num ber. In cross references to other chapters the (latin) chapter number is put first. References to the bibliography are again by "author" plus "year" in parentheses. The bibliography again contains only those papers which are discussed in the text and is in no way meant to be complete.

Introduction to Partial Differential Equations Incorporating an innovative modeling approach, this book for a one-semester differential equations course emphasizes conceptual understanding to help users relate information taught in the classroom to real-world experiences. Certain models reappear throughout the book as running themes to synthesize different concepts from multiple angles, and a dynamical systems focus emphasizes predicting the long-term behavior of these recurring models. Users will discover how to identify and harness the mathematics they will use in their careers, and apply it effectively outside the classroom. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version.

Ordinary Differential Equations Incorporating an innovative modeling approach, this book for a one-semester differential equations course emphasizes conceptual understanding to help users relate information taught in the classroom to real-world experiences. Certain models reappear throughout the book as running themes to synthesize different concepts from multiple angles, and a dynamical systems focus emphasizes predicting the long-term behavior of these recurring models. Users will discover how to identify and harness the mathematics they will use in their careers, and apply it effectively outside the classroom. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version.

Applied Stochastic Differential Equations

A First Course in Differential Equations with Modeling Applications The material presented in this book corresponds to a semester-long course, ``Linear Algebra and Differential Equations'', taught to sophomore students at UC Berkeley. In contrast with typical undergraduate texts, the book offers a unifying point of view on the subject, namely that linear algebra solves several clearly-posed classification problems about such geometric objects as quadratic forms and linear transformations. This attractive viewpoint on the classical theory agrees well with modern tendencies in advanced mathematics and is shared by many research mathematicians. However, the idea of classification seldom finds its way to basic programs in mathematics, and is usually unfamiliar to undergraduates. To meet the challenge, the book first guides the reader through the entire agenda of linear algebra in the elementary environment of two-dimensional geometry, and prior to spelling out the general idea and employing it in higher dimensions, shows how it works in applications such as linear ODE systems or stability of equilibria. Appropriate as a text for regular junior and honors sophomore level college classes, the book is accessible to high school students familiar with basic calculus, and can also be useful to engineering graduate students.

Differential Equations with Maple V® In this course, Boston University Professor Robert L. Devaney presents an introduction to differential equations.

Analytic Tools for Feynman Integrals This textbook describes rules and procedures for the use of Differential Operators (DO) in Ordinary Differential Equations (ODE). The book provides a detailed theoretical and numerical description of ODE. It presents a large variety of ODE and the chosen groups are used to solve a host of physical problems. Solving these problems is of interest primarily to students of science, such as physics, engineering, biology and chemistry. Scientists are greatly assisted by using the DO obeying several simple algebraic rules. The book describes these rules and, to help the reader, the vocabulary and the definitions used throughout the text are provided. A thorough description of the relatively straightforward methodology for solving ODE is given. The book provides solutions to a large number of associated problems. ODE that are integrable, or those that have one of the two variables missing in any explicit form are also treated with solved problems. The physics and applicable mathematics are explained and many associated problems are analyzed and solved in detail. Numerical solutions are analyzed and the level of exactness obtained under various approximations is discussed in detail.

Tools and Problems in Partial Differential Equations Skillfully organized introductory text examines origin of differential equations, then defines basic terms and outlines the general solution of a differential equation. Subsequent sections deal with integrating factors; dilution and accretion problems; linearization of first order systems; Laplace Transforms; Newton's Interpolation Formulas, more.

Computational Physics This book provides a self-contained introduction to ordinary differential equations and dynamical systems suitable for beginning graduate students. The first part begins with some simple examples of explicitly solvable equations and a first glance at qualitative methods. Then the fundamental results concerning the initial value problem are proved: existence, uniqueness, extensibility, dependence on initial conditions. Furthermore, linear equations are considered, including the Floquet theorem, and some perturbation results. As somewhat independent topics, the Frobenius method for linear equations in the complex domain is established and Sturm-Liouville boundary value problems, including oscillation theory, are investigated. The second part introduces the concept of a dynamical system. The Poincare-Bendixson theorem is proved, and several examples of planar systems from classical mechanics, ecology, and electrical engineering are investigated. Moreover, attractors, Hamiltonian systems, the KAM theorem, and periodic solutions are discussed. Finally, stability is studied, including the stable manifold and the Hartman-Grobman theorem for both continuous and discrete systems. The third part introduces chaos, beginning with the basics for iterated interval maps and ending with the Smale-Birkhoff theorem and the Melnikov method for homoclinic orbits. The text contains almost three hundred exercises. Additionally, the use of mathematical software systems is incorporated throughout, showing how they can help in the study of differential equations.

Periodic Differential Equations in the Plane This work aims to present, in a systematic manner, results including the existence and uniqueness of solutions for the Cauchy Type and Cauchy problems involving nonlinear ordinary fractional differential equations.

Fundamentals of Differential Equations The goal of this book is to describe the most powerful methods for evaluating multiloop Feynman integrals that are currently used in practice. This book supersedes the author's previous Springer book "Evaluating Feynman Integrals" and its textbook version "Feynman Integral Calculus." Since the publication of these two books, powerful new methods have arisen and conventional methods have been improved on in essential ways. A further qualitative change is the fact that most of the methods and the corresponding algorithms have now been implemented in computer codes which are often public. In comparison to the two previous books, three new chapters have been added: One is on sector decomposition, while the second describes a new method by Lee. The third new chapter concerns the asymptotic expansions of Feynman integrals in momenta and masses, which were described in detail in another Springer book, "Applied Asymptotic Expansions in Momenta and Masses," by the author. This chapter describes, on the basis of papers that appeared after the publication of said book, how to algorithmically discover the regions relevant to a given limit within the strategy of expansion by regions. In addition, the chapters on the method of Mellin-Barnes representation and on the method of integration by parts have been substantially rewritten, with an emphasis on the corresponding algorithms and computer codes.

Differential Equations with Boundary-value Problems 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.

Fourier Analysis and Nonlinear Partial Differential Equations Mathematics plays an important role in many scientific and engineering disciplines. This book deals with the numerical solution of differential equations, a very important branch of mathematics. Our aim is to give a practical and theoretical account of how to solve a large variety of differential equations, comprising ordinary differential equations, initial value problems and boundary value problems, differential algebraic equations, partial differential equations and delay differential equations. The solution of differential equations using R is the main focus of this book. It is therefore intended for the practitioner, the student and the scientist, who wants to know how to use R for solving differential equations. However, it has been our goal that non-mathematicians should at least understand the basics of the methods, while obtaining entrance into the relevant literature that provides more mathematical background. Therefore, each chapter that deals with R examples is preceded by a chapter where the theory behind the numerical methods being used is introduced. In the sections that deal with the use of R for solving differential equations, we have taken examples from a variety of disciplines, including biology, chemistry, physics, pharmacokinetics. Many examples are well-known test examples, used frequently in the field of numerical analysis.

Differential Equations Contains fully worked-out solutions to all of the odd-numbered exercises in the text.

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

Differential Equations In recent years, the Fourier analysis methods have expereinced a growing interest in the study of partial differential equations. In particular, those techniques based on the Littlewood-Paley decomposition have proved to be very efficient for the study of evolution equations. The present book aims at presenting self-contained, state- of-the- art models of those techniques with applications to different classes of partial differential equations: transport, heat, wave and Schrödinger equations. It also offers more sophisticated models originating from fluid mechanics (in particular the incompressible and compressible Navier-Stokes equations) or general relativity. It is either directed to anyone with a good undergraduate level of knowledge in analysis or useful for experts who are eager to know the benefit that one might gain from Fourier analysis when dealing with nonlinear partial differential equations.

Mathematical Tools for the Study of the Incompressible Navier-Stokes Equations and Related Models Drawing on examples from various areas of physics, this textbook introduces the reader to computer-based physics using Fortran® and Matlab®. It elucidates a broad palette of topics, including fundamental phenomena in classical and quantum mechanics, hydrodynamics and dynamical systems, as well as effects in field theories and macroscopic pattern formation described by (nonlinear) partial differential equations. A chapter on Monte Carlo methods is devoted to problems typically occurring in statistical physics. Contents Introduction Nonlinear maps Dynamical systems Ordinary differential equations I Ordinary differential equations II Partial differential equations I, basics Partial differential equations II, applications Monte Carlo methods (MC) Matrices and systems of linear equations Program library Solutions of the problems README and a short guide to FE-tools

Optimal Control of ODEs and DAEs Variational Techniques for Elliptic Partial Differential Equations, intended for graduate students studying applied math, analysis, and/or numerical analysis, provides the necessary tools to understand the structure and solvability of elliptic partial differential equations. Beginning with the necessary definitions and theorems from distribution theory, the book gradually builds the functional analytic framework for studying elliptic PDE using variational formulations. Rather than introducing all of the prerequisites in the first chapters, it is the introduction of new problems which motivates the development of the associated analytical tools. In this way the student who is encountering this material for the first time will be aware of exactly what theory is needed, and for which problems. Features A detailed and rigorous development of the theory of Sobolev spaces on Lipschitz domains, including the trace operator and the normal component of vector fields An integration of functional analysis concepts involving Hilbert spaces and the problems which can be solved with these concepts, rather than separating the two Introduction to the analytical tools needed for physical problems of interest like time-harmonic waves, Stokes and Darcy flow, surface differential equations, Maxwell cavity problems, etc. A variety of problems which serve to reinforce and expand upon the material in each chapter, including applications in fluid and solid mechanics

Ordinary Differential Equations This textbook offers a unique learning-by-doing introduction to the modern theory of partial differential equations. Through 65 fully solved problems, the book offers readers a fast but in-depth introduction to the field, covering advanced topics in microlocal analysis, including pseudo- and para-differential calculus, and the key classical equations, such as the Laplace, Schrödinger or Navier-Stokes equations. Essentially self-contained, the book begins with problems on the necessary tools from functional analysis, distributions, and the theory of functional spaces, and in each chapter the problems are preceded by a summary of the relevant results of the theory. Informed by the authors' extensive research experience and years of teaching, this book is for graduate students and researchers who wish to gain real working knowledge of the subject.

Theory and Applications of Fractional Differential Equations First-rate introduction for undergraduates examines first order equations, complex-valued solutions, linear differential operators, the Laplace transform, Picard's existence theorem, and much more. Includes problems and solutions.

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

Ordinary Differential Equations Brannan/Boyce’s Differential Equations: An Introduction to Modern Methods and Applications, 3rd Edition is consistent with the way engineers and scientists use mathematics in their daily work. The text emphasizes a systems approach to the subject and integrates the use of modern computing technology in the context of contemporary applications from engineering and science. The focus on fundamental skills, careful application of technology, and practice in modeling complex systems prepares students for the realities of the new millennium, providing the building blocks to be successful problem-solvers in today’s workplace. Section exercises throughout the text provide hands-on experience in modeling, analysis, and computer experimentation. Projects at the end of each chapter provide additional opportunities for students to explore the role played by differential equations in the sciences and engineering.

Solving Differential Equations in R Active Calculus is different from most existing texts in that: the text is free to read online in .html or via download by users in .pdf format; in the electronic format, graphics are in full color and there are live .html links to java applets; the text is open source, so interested instructor can gain access to the original source files via GitHub; the style of the text requires students to be active learners there are very few worked examples in the text, with there instead being 3-4 activities per section that engage students in connecting ideas, solving problems, and developing understanding of key calculus ideas; each section begins with motivating questions, a brief introduction, and a preview activity; each section concludes (in .html) with live WeBWorK exercises for immediate feedback, followed by a few challenging problems.

Differential Equations Driven by Rough Paths Periodic differential equations appear in many contexts such as in the theory of nonlinear oscillators, in celestial mechanics, or in population dynamics with seasonal effects. The most traditional approach to study these equations is based on the introduction of small parameters, but the search of nonlocal results leads to the application of several topological tools. Examples are fixed point theorems, degree theory, or bifurcation theory. These well-known methods are valid for equations of arbitrary dimension and they are mainly employed to prove the existence of periodic solutions. Following the approach initiated by Massera, this book presents some more delicate techniques whose validity is restricted to two dimensions. These typically produce additional dynamical information such as the instability of periodic solutions, the convergence of all solutions to periodic solutions, or connections between the number of harmonic and subharmonic solutions. The qualitative study of periodic planar equations leads naturally to a class of discrete dynamical systems generated by homeomorphisms or embeddings of the plane. To study these maps, Brouwer introduced the notion of a translation arc, somehow mimicking the notion of an orbit in continuous dynamical systems. The study of the properties of these translation arcs is full of intuition and often leads to "non-rigorous proofs". In the book, complete proofs following ideas developed by Brown are presented and the final conclusion is the Arc Translation Lemma, a counterpart of the Poincaré–Bendixson theorem for discrete dynamical systems. Applications to differential equations and discussions on the topology of the plane are the two themes that alternate throughout the five chapters of the book.

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

Functional Analysis, Sobolev Spaces and Partial Differential Equations Now enhanced with the innovative DE Tools CD-ROM and the iLrn teaching and learning system, this proven text explains the "how" behind the material and strikes a balance between the analytical, qualitative, and quantitative approaches to the study of differential equations. This accessible text speaks to students through a wealth of pedagogical aids, including an abundance of examples, explanations, "Remarks" boxes, definitions, and group projects. This book was written with the student's understanding firmly in mind. Using a straightforward, readable, and helpful style, this book provides a thorough treatment of boundary-value problems and partial differential equations.

Differential Equations This text is about the dynamical aspects of ordinary differential equations and the relations between dynamical systems and certain fields outside pure mathematics. It is an update of one of Academic Press's most successful mathematics texts ever published, which has become the standard textbook for graduate courses in this area.

The authors are tops in the field of advanced mathematics. Steve Smale is a Field's Medalist, which equates to being a Nobel prize winner in mathematics. Bob Devaney has authored several leading books in this subject area. Linear algebra prerequisites toned down from first edition Inclusion of analysis of examples of chaotic systems, including Lorenz, Rosssler, and Shilnikov systems Bifurcation theory included throughout.

Mastering Differential Equations Each year young mathematicians congregate in Saint Flour, France, and listen to extended lecture courses on new topics in Probability Theory. The goal of these notes, representing a course given by Terry Lyons in 2004, is to provide a straightforward and self supporting but minimalist account of the key results forming the foundation of the theory of rough paths.

Computational Differential Equations This rigorous treatment prepares readers for the study of differential equations and shows them how to research current literature. It emphasizes nonlinear problems and specific analytical methods. 1969 edition.