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“This book presents Advanced Calculus from a geometric point of view: instead of dealing with partial derivatives of functions of several variables, the derivative of the function is treated as a linear transformation between normed linear spaces. Not only does this lead to a simplified and transparent exposition of “difficult” results like the Inverse and Implicit Function Theorems but also permits, without any extra effort, a discussion of the Differential Calculus of functions defined on infinite dimensional Hilbert or Banach spaces. “The prerequisites demanded of the reader are modest: a sound understanding of convergence of sequences and series of real numbers, the continuity and differentiability properties of functions of a real variable and a little Linear Algebra should provide adequate background for understanding the book.”--BOOK JACKET.

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Differential Calculus on Normed Spaces - Henri Cartan - 2017-08-02

This classic and long out of print text by the famous French mathematician Henri Cartan, has finally been reprinted and reissued as an unabridged reprint of the Kershaw Publishing Company 1971 edition. The book has been brought back to market at remarkably low price for a new generation of university students and teachers. It provides a concise and beautifully written course on rigorous analysis. Unlike most similar texts, which usually develop the theory in either metric or Euclidean spaces, Cartan's text is set entirely in normed vector spaces, particularly Banach spaces. This not only allows the author to develop carefully the concepts of calculus in a setting of maximal generality, it allows him to unify both single and multivariable calculus over either the real or complex scalar fields by considering derivatives of nth orders as linear transformations. This prepares the student for the subsequent study of differentiable manifolds modeled on Banach spaces as well as graduate analysis courses, while normed spaces and their isomorphisms play a central role. More importantly, it's republication in an inexpensive edition finally makes available again the English translations of both long separated halves of Cartan's famous 1965-6 analysis course at the University of Paris: The Bourbakiian French tradition of Jean Dieudonné's Foundations of Modern Analysis, but a more accessible level and much more affordable than that classic.

Differential Calculus in Normed Linear Spaces - Methods of Nonlinear Analysis - Pavel Drabek - 2007-10-24

In this book, the basic methods of nonlinear analysis are emphasized and illustrated in simple examples. Every considered method is motivated, explained in a general form but in the simplest possible abstract framework. Its applications are shown, particularly to boundary value problems for elementary ordinary or partial differential equations. The text is organized in two levels: a self-contained basic and, organized in appendices, an advanced level for the more experienced reader. Exercises are an organic part of the exposition and accompany the reader throughout the book.

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This volume is dedicated to the fundamentals of convex functional analysis. It presents those aspects of functional analysis that are extensively used in various applications to mechanics and control theory. The purpose of the text is essentially two-fold. On one hand, a bare minimum of the theory required to understand the principles of functional, convex and set-valued analysis is presented. Numerous examples and diagrams provide an intuitive explanation of the principles as possible. On the other hand, the volume is largely self-contained. Those with a background in graduate mathematics will find a concise summary of all main definitions and theorems.


Optimal Control - V. M. Alekseev - 2013-12-11
There is an ever-growing interest in control problems today, connected with the urgent problems of the effective use of natural resources, manpower, materials, and technology. When referring to the most important achievements of science and technology in the 20th Century, one usually mentions the splitting of the atom, the exploration of space, and computer engineering. Achievements in control theory seem less spectacular when viewed against this background, but the applications of control theory are playing an important role in the development of modern civilization, and there is every reason to believe that this role will be even more significant in the future. Wherever there is active human participation, the problem arises of finding the best, or optimal, means of control. The demands of economics and technology have given birth to optimization problems which, in turn, have created new branches of mathematics. In the Forties, the investigation of problems of economics gave rise to a new branch of mathematical analysis called linear and convex program ming. At that time, problems of controlling flying vehicles and technolog ical processes of complex structures became important. A mathematical theory was formulated in the mid-Fifties known as optimal control theory. Here the maximum principle of L. S. Pontryagin played a pivotal role. Optimal control theory synthesized the concepts and methods of investigation using the classical methods of the calculus of variations and the methods of contemporary mathematics, for which Soviet mathematicians made valuable contributions.

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Linear and Nonlinear Functional Analysis with Applications - Philippe G. Ciarlet - 2013-10-10
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.

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A series of lectures given by the author during a CIMPA school in Beirut, selected topics from numerical analysis and optimization theory. This book has a pedagogical approach 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.

Analysis in Euclidean Space - Kenneth Hoffman - 2019-07-17
Developed for an introductory course in mathematical analysis at MIT, this text focuses on concepts, principles, and methods. Its introductions to real and complex analysis are responsible for much of the interest and importance of calculus, emphasizing power series expansions and introducing the theory of complex-analytic functions. Subsequent chapters cover sequences of functions, normed linear spaces, and the Lebesgue integral. They discuss most of the basic properties of integral and measure, including a brief look at orthogonal expansions. A chapter on differentiable mappings addresses implicit and inverse function theorems and the change of variable theorem. Exercises appear throughout the book, and extensive supplementary material includes a Bibliography, List of Symbols, Index, and an Appendix with background in elementary set theory.

Advanced Calculus of Several Variables - C. H. Edwards - 2014-05-10
Advanced Calculus of Several Variables provides a conceptual treatment of multivariable calculus. This book emphasizes the interplay of geometry, analysis through linear algebra, and approximation of nonlinear mappings by linear ones. The classical applications and computational methods that are responsible for much of the interest and importance of calculus are also considered. This text is organized into six chapters. Chapter I deals with linear algebra and geometry of Euclidean n-space Rn. The multivariable differential calculus is developed in Chapters II and III, while multivariable integral calculus is covered in Chapters IV and V. The last chapter is devoted to venerable problems of the calculus of variations. This publication is intended for students who have completed a standard introductory calculus sequence.

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Sub-Riemannian Geometry and Optimal Transport - Ludovic Rifford - 2014-04-03
The book provides an introduction to sub-Riemannian geometry and optimal transport and presents some of the recent progress in these two fields. The text is completely self-contained: the linear discussion, containing all the proofs of the stated results, leads the reader step by step from the notion of distribution at the very beginning to the existence of optimal transport maps for Lipschitz sub-Riemannian structure. The combination of geometry presented from an analytic point of view and of optimal transport, makes the book interesting for a very large community. This set of notes grew from a series of lectures given by the author during a CIMPA school in Beirut, Lebanon.

Elementary Functional Analysis - Georgi E. Shilov - 2013-04-15

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Essential Real Analysis - Michael Field - 2017-11-06
This book provides a rigorous introduction to the techniques and results of real analysis, metric spaces and multivariable differentiation, suitable for undergraduate courses. Starting from the very foundations of analysis, it offers a complete first course in real analysis, including topics rarely found in such detail in an undergraduate textbook such as the construction of non-analytic smooth functions, applications of the Euler-Maclaurin formula to estimates, and fractal geometry. Drawing on the author’s extensive teaching and research experience, the exposition is guided by carefully chosen examples and counter-examples, with the emphasis placed on the key ideas underlying the theory. Much of the content is informed by its applicability: Fourier analysis is developed to the point where it can be rigorously applied to partial differential equations or computation, and the theory of metric spaces includes applications to ordinary differential equations and fractals. Essential Real Analysis will appeal to students in pure and applied mathematics, as well as scientists looking to acquire a firm footing in mathematical analysis. Numerous exercises of varying difficulty, including some suitable for group work or class discussion, make this book suitable for self-study as well as lecture courses.

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Analysis in Vector Spaces - Mustafa A. Akcoglu - 2011-09-09
A rigorous introduction to calculus in vector spaces The concepts and theorems of advanced calculus combined with well-researched computational methods are essential to understanding nearby areas of quantitative science. Analysis in Vector Spaces presents the core material of classical subject through rigorous arguments, discussions, and examples. The book aims to educate not only knowledge of the major theoretical results, but also the geometric intuition needed for both mathematical problem-solving and modeling in the formal sciences. The authors begin with an outline of key concepts, terminology, and notation and also provide a basic introduction to set theory, the properties of real numbers, and elementary linear algebra. An elegant approach to eigenvector problems and the spectral theorems stage for later results on volume and integration. Subsequent chapters
integrated into parts of a Master degree program by course work organized sufficient details, even an undergraduate with mathematical maturity knowledge in finite-dimensional linear algebra, simple calculus and points, calculus and ordinary differential equations. It is aimed at beginners. This book provides an elementary introduction to the classical analysis on.

Classical Analysis On Normed Spaces - Ma Tsoy-wo - 1995-03-16
This book provides an elementary introduction to the classical analysis on normed spaces, paying special attention to nonlinear topics such as fixed points, calculus and ordinary differential equations. It is aimed at beginners who want to get through the basic material as soon as possible and then move on to do their own research immediately. It assumes only general knowledge in finite-dimensional linear algebra, simple calculus and elementary complex analysis. Since the treatment is self-contained with sufficient details, even an undergraduate with mathematical maturity should have no problem working through it alone. Various chapters can be integrated into parts of a Master degree program by course work organized by regional university. Restricted to finite-dimensional spaces rather than normed spaces, selected chapters can be used for a course in advanced calculus. Engineers and physicists may find this book a handy reference in classical analysis.

Differential Geometry with Applications to Mechanics and Physics - Yves Taalpaert - 2000-09-12
An introduction to differential geometry with applications to mechanics and physics. It covers topology and differential calculus in banach spaces; differentiable manifold and mapping submanifolds; tangent vector space; tangent bundle, vector field on manifold, Lie algebra structure, and one-parameter group of diffeomorphisms; exterior differential

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Introduction to Applied Linear Algebra - Stephen Boyd - 2018-06-07
A groundbreaking introduction to vectors, matrices, and least squares for engineering applications, offering a wealth of practical examples.

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Differential Forms - Henri Cartan - 2006-05-26
"Cartan's work provides a superb text for an undergraduate course in advanced calculus, but at the same time it furnishes the reader with an excellent foundation for global and nonlinear algebra." — Mathematical Review "Brilliantly successful." — Bulletin de l'Association des Professeurs de Mathématiques pour l'Enseignement Supérieur "The presentation is precise and detailed, the style lucid and almost conversational... clearly an outstanding text and work of reference." — Annales Cartan's Formes Différentielles was first published in France in 1967. It was based on the world-famous teacher's experience at the Faculty of Sciences in Paris, where his reputation as an outstanding exponent of the Bourbaki school of mathematics was first established. Addressed to second- and third-year students of mathematics, the material skillfully spans the pure and applied branches in the familiar French manner, so that the applied aspects gain in rigor while the pure mathematics loses none of its dignity. This book is equally essential as a course text, as a work of reference, or simply as a brilliant mathematical exercise.

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Nonlinear and Complex Analysis in Banach Spaces - Stephen Semmes - 1995-03-16
The book begins with an overview of the possibilities for applying ideas from functional analysis to problems in analysis. This text then provides a systematic exposition of several aspects of differential calculus in norms and topological linear spaces. Other chapters consider the various settings in nonlinear functional analysis in which differentiability is significant. This book discusses as well the generalized inverse for a bounded linear operator, whose range is not necessarily closed. The final chapter deals with the equations of hydrodynamics, which are usually highly nonlinear and difficult to solve. This book is a valuable resource for mathematicians. Readers who are interested in nonlinear functional analysis will also find this book useful.

Downloaded from github.com on December 14, 2021 by guest
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Linear Spaces and Differentiation Theory - Alfred Frölicher - 1988-08-18

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Spline Functions - K. Böhmer - 1976

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A Course in Differential Geometry and Lie Groups - S. Kumaresan - 2002-01-15

A Course in Differential Geometry and Lie Groups - S. Kumaresan - 2002-01-15

Calculus in Vector Spaces without Norm - A. Frölicher - 2006-11-15

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Analysis for Applied Mathematics - Ward Cheney - 2013-04-17

This well-written book contains the analytical tools, concepts, and viewpoints needed for modern applied mathematics. It treats various practical methods for solving problems such as differential equations, boundary value problems, and integral equations. Pragmatic approaches to difficult equations are presented, including the Galerkin method, the method of iteration, Newton's method, projection techniques, and homotopy methods.

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Spaces: An Introduction to Real Analysis - Tom L. Lindstrom - 2017-11-28

Spaces is a modern introduction to real analysis at the advanced undergraduate level. It is forward-looking in the sense that it first and foremost aims to provide students with the concepts and techniques they need in order to follow more advanced courses in mathematical analysis and neighboring fields. The only prerequisites are a solid understanding of calculus and linear algebra. Two introductory chapters will help students with the transition from computation-based calculus to theory-based analysis. The main topics covered are metric spaces, spaces of continuous functions, normed spaces, differentiation in normed spaces, measure and integration theory, and Fourier series. Although some of the topics are more advanced than what is usually found in books of this level, care is taken to present the material in a way that is suitable for the intended audience: concepts are carefully introduced and motivated, and proofs are presented in full detail. Applications to differential equations and Fourier analysis are used to illustrate the power of the theory, and exercises of all levels from routine to real challenges help students develop their skills and understanding. The text has been tested in classes at the University of Oslo over a number of years.

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**Analysis II** - Herbert Amann - 2008-07-31

The second volume of this introduction into analysis deals with the integration theory of functions of one variable, the multidimensional differential calculus and the theory of curves and line integrals. The modern and clear development that started in Volume I is continued. In this way a sustainable basis is created which allows the reader to deal with interesting applications that sometimes go beyond material represented in traditional textbooks. This applies, for instance, to the exploration of Nemytskii operators which enable a transparent introduction into the calculus of variations and the derivation of the Euler-Lagrange equations.

**Three-Dimensional Elasticity** - Philippe G. Ciarlet - 1994-02-02

This volume is a thorough introduction to contemporary research in elasticity, and may be used as a working textbook at the graduate level for courses in pure or applied mathematics or in continuum mechanics. It provides a thorough description (with emphasis on the nonlinear aspects) of the two competing mathematical models of three-dimensional elasticity, together with a mathematical analysis of these models. The book is as self-contained as possible.

**Mathematics Department Report** - Naval Ordnance Laboratory (White Oak, Md.)

**Representations of Finite Groups** - C. Musili - 1993-01-01