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Topological Groups and Related Structures, An Introduction to Topological Algebra.
Proceedings of the Colloquium on Differential Geometry, Debrecen, Hungary,July 26–30, 1994
Geometry of Lie Groups
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How Mathematicians Find Creative Solutions
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Differentiable and Complex Dynamics of Several Variables

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Positive Semigroups of Operators, and Applications Springer Science & Business Media
This book is the result of many years of research in Non-Euclidean Geometries and Geometry of Lie groups, as well as teaching at Moscow State University (1947- 1949), Azerbaijan State University (Baku) (1950-1955), Kolomna Pedagogical Col lege (1955-1970), Moscow Pedagogical University (1971-1990), and Pennsylvania State University (1990-1995). My first books on Non-Euclidean Geometries and Geometry of Lie groups were written in Russian and published in Moscow: Non-Euclidean Geometries (1955) [Ro1] , Multidimensional Spaces (1966) [Ro2] , and Non-Euclidean Spaces (1969) [Ro3]. In [Ro1] I considered non-Euclidean geometries in the broad sense, as geometry of simple Lie groups, since classical non-Euclidean geometries, hyperbolic and elliptic, are geometries of simple Lie groups of classes Bn and D , and geometries of complex n and quaternionic Hermitian elliptic and hyperbolic spaces are geometries of simple Lie groups of classes An and en. [Ro1] contains an exposition of the geometry of classical real non-Euclidean spaces and their interpretations as hyperspheres with identified antipodal points in Euclidean or pseudo-Euclidean spaces, and in projective and conformal spaces. Numerous interpretations of various spaces different from our usual space allow us, like stereoscopic vision, to see many traits of these spaces absent in the usual space.
Measure Theory Springer Science & Business Media
This book gives a compact exposition of the fundamentals of the theory of locally convex topological vector spaces. Furthermore it contains a survey of the most important results of a more subtle nature, which cannot be regarded as basic, but knowledge which is useful for understanding applications. Finally, the book explores some of such applications connected with differential calculus and measure theory in infinite-dimensional spaces. These applications are a central aspect of the book, which is why it is different from the wide range of existing texts on topological vector spaces.

Overall, this book develops differential and integral calculus on infinite-dimensional locally convex spaces by using methods and techniques of the theory of locally convex spaces. The target readership includes mathematicians and physicists whose research is related to infinite-dimensional analysis.

Infeasible Systems of Linear Inequalities Springer Science & Business Media

In the 60's, the work of Anderson, Chernavski, Kirby and Edwards showed that the group of homeomorphisms of a smooth manifold which are isotopic to the identity is a simple group. This led Smale to conjecture that the group Diff'" (M)o of cr diffeomorphisms, r ~ 1, of a smooth manifold M, with compact supports, and isotopic to the identity through compactly supported isotopies, is a simple group as well. In this monograph, we give a fairly detailed proof that DifF(M)o is a simple group. This theorem was proved by Herman in the case M is the torus rn in 1971, as a consequence of the Nash-Moser-Sergeraert implicit function theorem. Thurston showed in 1974 how Herman's result on rn implies the general theorem for any smooth manifold M. The key idea was to vision an isotopy in Diff'"(M) as a foliation on M x [0, 1]. In fact he discovered a deep connection between the local homology of the group of diffeomorphisms and the homology of the Haefliger classifying space for foliations. Thurston's paper [180] contains just a brief sketch of the proof. The details have been worked out by Mather [120], [124], [125], and the author [12]. This circle of ideas that we call the "Thurston tricks" is discussed in chapter 2. It explains how in certain groups of diffeomorphisms, perfectness leads to simplicity. In connection with these ideas, we discuss Epstein's theory [52], which we apply to contact diffeomorphisms in chapter 6.

General Topology III Academic Publishers

The theory of function spaces endowed with the topology of point wise convergence, or Cp-theory, exists at the intersection of three important areas of mathematics: topological algebra, functional analysis, and general topology. Cp-theory has an important role in the classification and unification of heterogeneous results from each of these areas of research. Through over 500 carefully selected problems and exercises, this volume provides a self-contained introduction to Cp-theory and general topology. By systematically introducing each of the major topics in Cp-theory, this volume is designed to bring a dedicated reader from basic topological principles to the frontiers of modern research. Key features include: - A unique problem-based introduction to the theory of function spaces. - Detailed solutions to each of the presented problems and exercises. - A comprehensive bibliography reflecting the state-of-the-art in modern Cp-theory. - Numerous open problems and directions for further research. This volume can be used as a textbook for courses in both Cp-theory and general topology as well as a reference guide for specialists studying Cp-theory and related topics. This book also provides numerous topics for PhD specialization as well as a large variety of material suitable for graduate research.

New Developments in Differential Geometry Springer

This text contains a detailed introduction to general topology and an introduction to algebraic topology via its most classical and elementary segment. Proofs of theorems are separated from their formulations and are gathered at the end of each chapter, making this book appear like a problem book and also giving it appeal to the expert as a handbook. The book includes about 1,000 exercises.

A General Topology Workbook Walter de Gruyter GmbH & Co KG

This book provides an upto date information on metric, connection and curva ture symmetries used in geometry and physics. More specifically, we present the characterizations and classifications of Riemannian and Lorentzian manifolds (in particular, the spacetimes of general relativity) admitting metric (i.e., Killing, ho mothetic and conformal), connection (i.e., affine conformal and projective) and curvature symmetries. Our approach, in this book, has the following outstanding features: (a) It is the first-ever attempt of a comprehensive collection of the works of a very large number of researchers on all the above mentioned symmetries. (b) We have aimed at bringing together the researchers interested in differential geometry and the mathematical physics of general relativity by giving an invariant as well as the index form of the main formulas and results. (c) Attempt has been made to support several main mathematical results by citing physical example(s) as applied to general relativity. (d) Overall the presentation is self contained, fairly accessible and in some special cases supported by an extensive list of cited references. (e) The material covered should stimulate future research on symmetries. Chapters 1 and 2 contain most of the prerequisites for reading the rest of the book. We present the language of semi-Euclidean spaces, manifolds, their tensor calculus; geometry of null curves, non-degenerate and degenerate (light like) hypersurfaces. All this is described in invariant as well as the index form.

Recent Progress in General Topology II

Fundamentals of General TopologyProblems and Exercises

This means that semigroup theory may be applied directly to the study of the equation l'!.f = h on M. In [45] Yau proves that, for h ~ 0, there are no nonconstant, nonnegative solutions f in [j' for 1

Problem Textbook Springer Science & Business Media

"The clarity of the author's thought and the carefulness of his exposition make reading this book a pleasure," noted the Bulletin of the American Mathematical Society upon the 1955 publication of John L. Kelley's General Topology. This comprehensive treatment for beginning graduate-level students immediately found a significant audience, and it remains a highly worthwhile and relevant book for students of topology and for professionals in many areas. A systematic exposition of the part of general topology that has proven useful in several branches of mathematics, this volume is especially intended as background for modern analysis. An extensive preliminary chapter presents mathematical foundations for the main text. Subsequent chapters explore topological spaces, the Moore-Smith convergence, product and quotient spaces, embedding and metrization, and compact, uniform, and function spaces. Each chapter concludes with an abundance of problems, which form integral parts of the discussion as well as reinforcements and counter examples that mark the boundaries of possible theorems. The book concludes with an extensive index that provides supplementary material on elementary set theory.

Fundamentals of general topology Springer Science & Business Media

This book has been called a Workbook to make it clear from the start that it is not a conventional textbook. Conventional textbooks proceed by giving in each section or chapter first the definitions of the terms to be used, the concepts they are to work with, then some theorems involving these terms (complete with proofs) and finally some examples and exercises to test the readers' understanding of the definitions and the theorems. Readers of this book will indeed find all the conventional constituents--definitions, theorems, proofs, examples and exercises but not in the conventional arrangement. In the first part of the book will be found a quick review of the basic

definitions of general topology interspersed with a large num ber of exercises, some of which are also described as theorems. (The use of the word Theorem is not intended as an indication of difficulty but of importance and usefulness.) The exercises are deliberately not "graded"-after all the problems we meet in mathematical "real life" do not come in order of difficulty; some of them are very simple illustrative examples; others are in the nature of tutorial problems for a conven tional course, while others are quite difficult results. No solutions of the exercises, no proofs of the theorems are included in the first part of the book-this is a Workbook and readers are invited to try their hand at solving the problems and proving the theorems for themselves.

Problems and Exercises Academic Press
Foundations of General Topology presents the value of careful presentations of proofs and shows the power of abstraction. This book provides a careful treatment of general topology. Organized into 11 chapters, this book begins with an overview of the important notions about cardinal and ordinal numbers. This text then presents the fundamentals of general topology in logical order processing from the most general case of a topological space to the restrictive case of a complete metric space. Other chapters consider a general method for completing a metric space that is applicable to the rationals and present the sufficient conditions for metrizability. This book discusses as well the study of spaces of real-valued continuous functions. The final chapter deals with uniform continuity of functions, which involves finding a distance that satisfies certain requirements for all points of the space simultaneously. This book is a valuable resource for students and research workers.

Recent Progress in General Topology III Elsevier
The book presents surveys describing recent developments in most of the primary subfields of General Topology, and its applications to Algebra and Analysis during the last decade, following the previous editions (North Holland, 1992 and 2002). The book was prepared in connection with the Prague Topological Symposium, held in 2011. During the last 10 years the focus in General Topology changed and therefore the selection of topics differs from that chosen in 2002. The following areas experienced significant developments: Fractals, Coarse Geometry/Topology, Dimension Theory, Set Theoretic Topology and Dynamical Systems.

A Cp-Theory Problem Book Springer Science & Business Media
Topology continues to be a topic of prime importance in contemporary mathematics, but until the publication of this book there were few if any introductions to topology for undergraduates. This book remedied that need by offering a carefully thought-out, graduated approach to point set topology at the undergraduate level. To make the book as accessible as possible, the author approaches topology from a geometric and axiomatic standpoint; geometric, because most students come to the subject with a good deal of geometry behind them, enabling them to use their geometric intuition; axiomatic, because it parallels the student's experience with modern algebra, and keeps the book in harmony with current trends in mathematics. After a discussion of such preliminary topics as the algebra of sets, Euler-Venn diagrams and infinite sets, the author takes up basic definitions and theorems regarding topological spaces (Chapter 1). The second chapter deals with continuous functions (mappings) and homeomorphisms, followed by two chapters on special types of topological spaces (varieties of compactness and varieties of connectedness). Chapter 5 covers metric spaces. Since basic point set topology serves as a foundation not only for functional analysis but also for more advanced work in point set topology and algebraic topology, the author has included topics aimed at students with interests other than analysis. Moreover, Dr. Baum has supplied quite detailed proofs in the beginning to help students approaching this type of axiomatic mathematics for the first time. Similarly, in the first part of the book problems are elementary, but they become progressively more difficult toward the end of the book. References have been supplied to suggest further reading to the interested student.

Paracompactness, Function Spaces, Descriptive Theory Springer Science & Business Media
This concise, self-contained textbook gives an in-depth look at problem-solving from a mathematician’s point-of-view. Each chapter builds off the previous one, while introducing a variety of methods that could be used when approaching any given problem. Creative thinking is the key to solving mathematical problems, and this book outlines the tools necessary to improve the reader’s technique. The text is divided into twelve chapters, each providing corresponding hints, explanations, and finalization of solutions for the problems in the given chapter. For the reader’s convenience, each exercise is marked with the required background level. This book implements a variety of strategies that can be used to solve mathematical problems in fields such as analysis, calculus, linear and multilinear algebra and combinatorics. It includes applications to mathematical physics, geometry, and other branches of mathematics. Also provided within the text are real-life problems in engineering and technology. Thinking in Problems is intended for advanced undergraduate and graduate students in the classroom or as a self-study guide. Prerequisites include linear algebra and analysis.

Topological Vector Spaces and Their Applications Springer Science & Business Media
This reference work deals with important topics in general topology and their role in functional analysis and axiomatic set theory, for graduate students and researchers working in topology, functional analysis, set theory and probability theory. It provides a guide to recent research findings, with three contributions by Arhangel'skii and Choban.

Encyclopaedia of Mathematics Courier Corporation
The book presents surveys describing recent developments in most of the primary subfields of General Topology and its applications to Algebra and Analysis during the last decade. It follows freely the previous edition (North Holland, 1992), Open Problems in Topology (North Holland, 1990) and Handbook of Set-Theoretic Topology (North Holland, 1984). The book was prepared in connection with the Prague Topological Symposium, held in 2001. During the last 10 years the focus in General Topology changed and therefore the selection of topics differs slightly from those chosen in 1992. The following areas experienced significant developments: Topological Groups, Function Spaces, Dimension Theory, Hyperspaces, Selections, Geometric Topology (including Infinite-Dimensional Topology and the Geometry of Banach Spaces). Of course, not every important topic could be included in this book. Except surveys, the book contains several historical essays written by such eminent topologists as: R.D. Anderson, W.W. Comfort, M. Henriksen, S. Mardešić, J. Nagata, M.E. Rudin, J.M. Smirnov (several reminiscences of L. Vietoris are added). In addition to extensive author and subject indexes, a list of all problems and questions posed in this book are added. List of all authors of surveys: A. Arhangel'skii, J. Baker and K. Kunen, H.

Bennett and D. Lutzer, J. Dijkstra and J. van Mill, A. Dow, E. Glasner, G. Godefroy, G. Gruenhage, N. Hindman and D. Strauss, L. Hola and J. Pelant, K. Kawamura, H.-P. Kuenzi, W. Marciszewski, K. Martin and M. Mislove and M. Reed, R. Pol and H. Torunczyk, D. Repovs and P. Semenov, D. Shakhmatov, S. Solecki, M. Tkachenko.

Continuous Selections of Multivalued Mappings Courier Dover Publications

This volume presents a broad introduction to the topological fixed point theory of multivalued (set-valued) mappings, treating both classical concepts as well as modern techniques. A variety of up-to-date results is described within a unified framework.

Algorithmic and Computer Methods for Three-Manifolds Elsevier

This two-volume monograph obtains fundamental notions and results of the standard differential geometry of smooth (CINFINITY) manifolds, without using differential calculus. Here, the sheaf-theoretic character is emphasised. This has theoretical advantages such as greater perspective, clarity and unification, but also practical benefits ranging from elementary particle physics, via gauge theories and theoretical cosmology (`differential spaces'), to non-linear PDEs (generalised functions). Thus, more general applications, which are no longer `smooth' in the classical sense, can be coped with. The treatise might also be construed as a new systematic endeavour to confront the ever-increasing notion that the `world around us is far from being smooth enough'. Audience: This work is intended for postgraduate students and researchers whose work involves differential geometry, global analysis, analysis on manifolds, algebraic topology, sheaf theory, cohomology, functional analysis or abstract harmonic analysis.

Elementary Topology Springer Science & Business Media

Among the best available reference introductions to general topology, this volume is appropriate for advanced undergraduate and beginning graduate students. Includes historical notes and over 340 detailed exercises. 1970 edition. Includes 27 figures.

General Topology Springer

Proceedings of the Colloquium on Differential Geometry, Debrecen, Hungary, July 26-30, 1994

Third Edition Springer Science & Business Media

Nonstandard methods of analysis consist generally in comparative study of two interpretations of a mathematical claim or construction given as a formal symbolic expression by means of two different set-theoretic models: one, a "standard" model and the other, a "nonstandard" model. The second half of the twentieth century is a period of significant progress in these methods and their rapid development in a few directions. The first of the latter appears often under the name coined by its inventor, A. Robinson. This memorable but slightly presumptuous and defiant term, non standard analysis, often swaps places with the term Robinsonian or classical non standard analysis. The characteristic feature of Robinsonian analysis is a frequent usage of many controversial concepts appealing to the actual infinitely small and infinitely large quantities that have resided happily in natural sciences from ancient times but were strictly forbidden in modern mathematics for many decades. The present-day achievements revive the forgotten term infinitesimal analysis which reminds us expressively of the heroic bygones of Calculus. Infinitesimal analysis expands rapidly, bringing about radical reconsideration of the general conceptual system of mathematics. The principal reasons for this progress are twofold. Firstly, infinitesimal analysis provides us with a novel under standing for the method of indivisibles rooted deeply in the mathematical classics.