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<p>Topology-Tai-Danae Bradley 2020 "This book presents a modern, category-theory-based approach to topology to supplement the more traditional algebraic topology graduate course"--</p>
<p>Topology-Tai-Danae Bradley 2020-08-18 A graduate-level textbook that presents basic topology from the perspective of category theory. This graduate-level textbook on topology takes a unique approach: it reintroduces basic, point-set topology from a more modern, categorical perspective. Many graduate students are familiar with the ideas of point-set topology and they are ready to learn something new about them. Teaching the subject using category theory--a contemporary branch of mathematics that provides a way to represent abstract concepts--both deepens students' understanding of elementary topology and lays a solid foundation for future work in advanced topics.</p>
<p>Monoidal Topology-Dirk Hofmann 2014-07-31 Monoidal Topology describes an active research area that, after various past proposals on how to axiomatize 'spaces' in terms of convergence, began to emerge at the beginning of the millennium. It combines Barr's relational presentation of topological spaces in terms of ultrafilter convergence with Lawvere's interpretation of metric spaces as small categories enriched over the extended real half-line. Hence, equipped with a quantale V (replacing the reals) and a monad T (replacing the ultrafilter monad) laxly extended from set maps to V-valued relations, the book develops a categorical theory of (T,V)-algebras that is inspired simultaneously by its metric and topological roots. The book highlights in particular the distinguished role of equationally defined structures within the given lax-algebraic context and presents numerous new results ranging from topology and approach theory to domain theory. All the necessary pre-requisites in order and category theory are presented in the book.</p>
<p>Categorical Foundations-Maria Cristina Pedicchio 2004 Publisher Description</p>
<p>Quasi-Hopf Algebras-Daniel Bulacu 2019-02-28 This self-contained book dedicated to Drinfeld's quasi-Hopf algebras takes the reader from the basics to the state of the art.</p>
<p>A Concise Course in Algebraic Topology-J. P. May 1999-09 Algebraic topology is a basic part of modern mathematics, and some knowledge of this area is indispensable for any advanced work relating to geometry, including topology itself, differential geometry, algebraic geometry, and Lie groups. This book provides a detailed treatment of algebraic topology both for teachers of the subject and for advanced graduate students in mathematics either specializing in this area or continuing on to other fields. J. Peter May's approach reflects the enormous internal developments within algebraic topology over the past several decades, most of which are largely unknown to mathematicians in other fields. But he also retains the classical presentations of various topics where appropriate. Most chapters end with problems that further explore and refine the concepts presented. The final four chapters provide sketches of substantial areas of algebraic topology that are normally omitted from introductory texts, and the book concludes with a list of suggested readings for those interested in delving further into the field.</p>
<p>Theory of Topological Structures-Gerhard Preuß 2012-12-06 Approach your problems from the right end It isn't that they can't see the solution. It is and begin with the answers. Then one day, that they can't see the problem. perhaps you will find the final question. G. K. Chesterton. The Scandal of Father 'The Hermit Clad in Crane Feathers' in R. Brown 'The point of a Pin'. van Gulik's The Chinese Maze Murders. Growing specialization and diversification have brought a host of monographs and textbooks on increasingly specialized topics. However, the "tree" of knowledge of mathematics and related fields does not grow only by putting forth new branches. It also happens, quite often in fact, that branches which were thought to be completely disparate are suddenly seen to be related. Further, the kind and level of sophistication of mathematics applied in various sciences has changed drastically in recent years: measure theory is used (non-trivially) in regional and theoretical economics; algebraic geometry interacts with physics; the Minkowsky lemma, coding theory and the structure of water meet one another in packing and covering theory; quantum fields, crystal defects and mathematical programming profit from homotopy theory; Lie algebras are relevant to filtering; and prediction and electrical engineering can use Stein spaces. And in addition to this there are such new emerging subdisciplines as "experimental mathematics", "CFD", "completely integrable systems", "chaos, synergetics and large-scale order", which are almost impossible to fit into the existing classification schemes. They draw upon widely different sections of mathematics.</p>
<p>Categorical Aspects of Topology and Analysis-B. Banaschewski 2006-11-14</p>
<p>Categorical Homotopy Theory-Emily Riehl 2014-05-26 This book develops abstract homotopy theory from the categorical perspective with a particular focus on examples. Part I discusses two competing perspectives by which one typically first encounters homotopy (co)limits: either as derived functors definable when the appropriate diagram categories admit a compatible model structure, or through particular formulae that give the right notion in certain examples. Emily Riehl unifies these seemingly rival perspectives and demonstrates that model structures on diagram categories are irrelevant. Homotopy (co)limits are explained to be a special case of weighted (co)limits, a foundational topic in enriched category theory. In Part II, Riehl further examines this topic, separating categorical arguments from homotopical ones. Part III treats the most ubiquitous axiomatic framework for homotopy theory - Quillen's model categories. Here, Riehl simplifies familiar model categorical lemmas and definitions by focusing on weak factorization systems. Part IV introduces quasi-categories and homotopy coherence.</p>
<p>A Topological Picturebook-George K. Francis 2013-03-19 Praise for George Francis's A Topological Picturebook: Bravo to Springer for reissuing this unique and beautiful book! It not only reminds the older generation of the pleasures of doing mathematics by hand, but also shows the new generation what "hands on" really means. - John Stillwell, University of San Francisco The Topological Picturebook has taught a whole generation of mathematicians to draw, to see, and to think. - Tony Robbin, artist and author of Shadows of Reality: The Fourth Dimension in Relativity, Cubism, and Modern Thought The classic reference for how to present topological information visually, full of amazing hand-drawn pictures of complicated surfaces. - John Sullivan, Technische Universitat Berlin A Topological Picturebook lets students see topology as the original discoverers conceived it: concrete and visual, free of the formalism that burdens conventional textbooks. - Jeffrey Weeks, author of The Shape of Space A Topological Picturebook is a visual feast for anyone concerned with mathematical images. Francis provides exquisite examples to build one's "visualization muscles". At the same time, he explains the underlying principles and design techniques for readers to create their own lucid drawings. - George W. Hart, Stony Brook University In this collection of narrative gems and intriguing hand-drawn pictures, George Francis demonstrates the chicken-and-egg relationship, in mathematics, of image and text. Since the book was first published, the case for pictures in mathematics has been won, and now it is time to reflect on their meaning. A Topological Picturebook remains indispensable. - Marjorie Senechal, Smith College and co-editor of the Mathematical Intelligencer</p>
<p>Topology and Geometry-Glen E. Bredon 2013-03-09 This book offers an introductory course in algebraic topology. Starting with general topology, it discusses differentiable manifolds, cohomology, products and duality, the fundamental group, homology theory, and homotopy theory. From the reviews: "An interesting and original graduate text in topology and geometry...a good lecturer can use this text to create a fine course....A beginning graduate student can use this text to learn a great deal of mathematics."—MATHEMATICAL REVIEWS</p>
<p>Topology and Groupoids-Ronald Brown 2006 Annotation. The book is intended as a text for a two-semester course in topology and algebraic topology at the advanced undergraduate orbeginning graduate level. There are over 500 exercises, 114 figures, numerous diagrams. The general direction of the book is towardhomotopy theory with a geometric point of view. This book would providea more than adequate background for a standard algebraic topology coursethat begins with homology theory. For more information seewww.bangor.ac.uk/r.brown/topgpd.htmlThis version dated April 19, 2006, has a number of corrections made.</p>
<p>Measure, Topology, and Fractal Geometry-Gerald A. Edgar 2013-04-17 From the reviews: "In the world of mathematics, the 1980's might well be described as the "decade of the fractal". Starting with Benoit Mandelbrot's remarkable text The Fractal Geometry of Nature, there has been a deluge of books, articles and television programmes about the beautiful mathematical objects, drawn by computers using recursive or iterative algorithms, which Mandelbrot christened fractals. Gerald Edgar's book is a significant addition to this deluge. Based on a course given to talented high- school students at Ohio University in 1988, it is, in fact, an advanced undergraduate textbook about the mathematics of fractal geometry, treating such topics as metric spaces, measure theory, dimension theory, and even some algebraic topology. However, the book also contains many good illustrations of fractals (including 16 color plates), together with Logo programs which were used to generate them. ... Here then, at last, is an answer to the question on the lips of so many: 'What exactly is a fractal?' I do not expect many of this book's readers to achieve a mature understanding of this answer to the question, but anyone interested in finding out about the mathematics of fractal geometry could not choose a better place to start looking." #Mathematics Teaching#1</p>
<p>Topology Via Logic-Steven Vickers 1996-08-22 This is an advanced textbook on topology for computer scientists. It is based on a course given by the author to postgraduate students of computer science at Imperial College.</p>
<p>Applications of Category Theory to Fuzzy Subsets-S.E. Rodabaugh 1991-11-30 This book has a fundamental relationship to the International Seminar on Fuzzy Set Theory held each September in Linz, Austria. First, this volume is an extended account of the eleventh Seminar of 1989. Second, and more importantly, it is the culmination of the tradition of the preceding ten Seminars. The purpose of the Linz Seminar, since its inception, was and is to foster the development of the mathematical aspects of fuzzy sets. In the earlier years, this was accomplished by bringing together for a week small grou ps of mathematicians in various fields in an intimate, focused environment which promoted much informal, critical discussion in addition to formal presentations. Beginning with the tenth Seminar, the intimate setting was retained, but each Seminar narrowed in theme; and participation was broadened to include both younger scholars within, and established mathematicians outside, the mathematical mainstream of fuzzy sets theory. Most of the material of this book was developed over the years in close association with the Seminar or influenced by what transpired at Linz. For much of the content, it played a crucial role in either stimulating this material or in providing feedback and the necessary screening of ideas. Thus we may fairly say that the book, and the eleventh Seminar to which it is directly related, are in many respects a culmination of the previous Seminars.</p>
<p>More Concise Algebraic Topology-J. P. May 2012-02 With firm foundations dating only from the 1950s, algebraic topology is a relatively young area of mathematics. There are very few textbooks that treat fundamental topics beyond a first course, and many topics now essential to the field are not treated in any textbook. J. Peter May's A Concise Course in Algebraic Topology addresses the standard first course material, such as fundamental groups, covering spaces, the basics of homotopy theory, and homology and cohomology. In this sequel, May and his coauthor, Kathleen Ponto, cover topics that are essential for algebraic topologists and others interested in algebraic topology, but that are not treated in standard texts. They focus on the localization and completion of topological spaces, model categories, and Hopf algebras. The first half of the book sets out the basic theory of localization and completion of nilpotent spaces, using the most elementary treatment the authors know of. It makes no use of simplicial techniques or model categories, and it provides full details of other necessary preliminaries. With these topics as motivation, most of the second half of the book sets out the theory of model categories, which is the central organizing framework for homotopical algebra in general. Examples from topology and homological algebra are treated in parallel. A short last part develops the basic theory of bialgebras and Hopf algebras.</p>
<p>Category Theory And Applications: A Textbook For Beginners (Second Edition)-Marco Grandis 2021-03-05 Category Theory now permeates most of Mathematics, large parts of theoretical Computer Science and parts of theoretical Physics. Its unifying power brings together different branches, and leads to a better understanding of their roots.This book is addressed to students and researchers of these fields and can be used as a text for a first course in Category Theory. It covers the basic tools, like universal properties, limits, adjoint functors and monads. These are presented in a concrete way, starting from examples and exercises taken from elementary Algebra, Lattice Theory and Topology, then developing the theory together with new exercises and applications.A reader should have some elementary knowledge of these three subjects, or at least two of them, in order to be able to follow the main examples, appreciate the unifying power of the categorical approach, and discover the subterranean links brought to light and formalised by this perspective.Applications of Category Theory form a vast and differentiated domain. This book wants to present the basic applications in Algebra and Topology, with a choice of more advanced ones, based on the interests of the author. References are given for applications in many other fields.In this second edition, the book has been entirely reviewed, adding many applications and exercises. All non-obvious exercises have now a solution (or a reference, in the case of an advanced topic); solutions are now collected in the last chapter.</p>
<p>Computational Algebraic Geometry-HENRY SCHENCK 2003-10-06 Table of contents</p>

A New Foundation for Representation in Cognitive and Brain Science-Jaime Gómez-Ramírez 2013-11-22 The purpose of the book is to advance in the understanding of brain function by defining a general framework for representation based on category theory. The idea is to bring this mathematical formalism into the domain of neural representation of physical spaces, setting the basis for a theory of mental representation, able to relate empirical findings, uniting them into a sound theoretical corpus. The innovative approach presented in the book provides a horizon of interdisciplinary collaboration that aims to set up a common agenda that synthesizes mathematical formalization and empirical procedures in a systemic way. Category theory has been successfully applied to qualitative analysis, mainly in theoretical computer science to deal with programming language semantics. Nevertheless, the potential of category theoretic tools for quantitative analysis of networks has not been tackled so far. Statistical methods to investigate graph structure typically rely on network parameters. Category theory can be seen as an abstraction of graph theory. Thus, new categorical properties can be added into network analysis and graph theoretic constructs can be accordingly extended in more fundamental basis. By generalizing networks using category theory we can address questions and elaborate answers in a more fundamental way without waiving graph theoretic tools. The vital issue is to establish a new framework for quantitative analysis of networks using the theory of categories, in which computational neuroscientists and network theorists may tackle in more efficient ways the dynamics of brain cognitive networks. The intended audience of the book is researchers who wish to explore the validity of mathematical principles in the understanding of cognitive systems. All the actors in cognitive science: philosophers, engineers, neurobiologists, cognitive psychologists, computer scientists etc. are akin to discover along its pages new unforeseen connections through the development of concepts and formal theories described in the book. Practitioners of both pure and applied mathematics e.g., network theorists, will be delighted with the mapping of abstract mathematical concepts in the terra incognita of cognition.

Sets for Mathematics-F. William Lawvere 2003-01-27 In this book, first published in 2003, categorical algebra is used to build a foundation for the study of geometry, analysis, and algebra.

Encyclopedia of General Topology-K.P. Hart 2003-11-18 This book is designed for the reader who wants to get a general view of the terminology of General Topology with minimal time and effort. The reader, whom we assume to have only a rudimentary knowledge of set theory, algebra and analysis, will be able to find what they want if they will properly use the index. However, this book contains very few proofs and the reader who wants to study more systematically will find sufficiently many references in the book. Key features:
• More terms from General Topology than any other book ever published
• Short and informative articles
• Authors include the majority of top researchers in the field
• Extensive indexing of terms

Topological Signal Processing-Michael Robinson 2014-01-07 Signal processing is the discipline of extracting information from collections of measurements. To be effective, the measurements must be organized and then filtered, detected, or transformed to expose the desired information. Distortions caused by uncertainty, noise, and clutter degrade the performance of practical signal processing systems. In aggressively uncertain situations, the full truth about an underlying signal cannot be known. This book develops the theory and practice of signal processing systems for these situations that extract useful, qualitative information using the mathematics of topology -- the study of spaces under continuous transformations. Since the collection of continuous transformations is large and varied, tools which are topologically-motivated are automatically insensitive to substantial distortion. The target audience comprises practitioners as well as researchers, but the book may also be beneficial for graduate students.

Topos Theory-P.T. Johnstone 2014-01-15 Focusing on topos theory's integration of geometric and logical ideas into the foundations of mathematics and theoretical computer science, this volume explores internal category theory, topologies and sheaves, geometric morphisms, and other subjects. 1977 edition.

Topology and Its Applications-William F. Basener 2013-06-12 Discover a unique and modern treatment of topology employing across-disciplinary approach Implemented recently to understand diverse topics, such as cellbiology, superconductors, and robot motion, topology has beentransformed from a theoretical field that highlights mathematicaltheory to a subject that plays a growing role in nearly all fieldsof scientific investigation. Moving from the concrete to theabstract, Topology and Its Applications displays both the beautifuland utility of topology, first presenting the essentials oftopology followed by its emerging role within the new frontiers inresearch. Filling a gap between the teaching of topology and its modernuses in real-world phenomena, Topology and Its Applications isorganized around the mathematical theory of topology, a frameworkof rigorous theorems, and clear, elegant proofs. This book is the first of its kind to present applications incomputer graphics, economics, dynamical systems, condensed matterphysics, biology, robotics, chemistry, cosmology, material science,computational topology, and population modeling, as well as otherareas of science and engineering. Many of these applications arepresented in optional sections, allowing an instructor to customize the presentation. The author presents a diversity of topological areas, includingpoint-set topology, geometric topology, differential topology, andalgebraic/combinatorial topology. Topics within these areasinclude: Open sets Compactness Homotopy Surface classification Index theory on surfaces Manifolds and complexes Topological groups The fundamental group and homology Special "core intuition" segments throughout the book brieflyexplain the basic intuition essential to understanding severaltopics. A generous number of figures and examples, many of whichcome from applications such as liquid crystals, space probe data,and computer graphics, are all available from the publisher's Website.

An Invitation to Applied Category Theory-Brendan Fong 2019-07-31 Category theory is unmatched in its ability to organize and layer abstractions and to find commonalities between structures of all sorts. No longer the exclusive preserve of pure mathematicians, it is now proving itself to be a powerful tool in science, informatics, and industry. By facilitating communication between communities and building rigorous bridges between disparate worlds, applied category theory has the potential to be a major organizing force. This book offers a self-contained tour of applied category theory. Each chapter follows a single thread motivated by a real-world application and discussed with category-theoretic tools. We see data migration as an adjoint functor, electrical circuits in terms of monoidal categories and operads, and collaborative design via enriched profunctors. All the relevant category theory, from simple to sophisticated, is introduced in an accessible way with many examples and exercises, making this an ideal guide even for those without experience of university-level mathematics.

Stone Spaces-Peter T. Johnstone 1982 A unified treatment of the corpus of mathematics that has developed out of M. H. Stone's representation theorem for Boolean algebras (1936) which has applications in almost every area of modern mathematics.

Category Theory in Context-Emily Riehl 2017-03-09 Introduction to concepts of category theory — categories, functors, natural transformations, the Yoneda lemma, limits and colimits, adjunctions, monads — revisits a broad range of mathematical examples from the categorical perspective. 2016 edition.

Basic Category Theory-Tom Leinster 2014-07-24 A short introduction ideal for students learning category theory for the first time.

An Illustrated Introduction to Topology and Homotopy-Sasho Kalajdziewski 2015-03-24 An Illustrated Introduction to Topology and Homotopy explores the beauty of topology and homotopy theory in a direct and engaging manner while illustrating the power of the theory through many, often surprising, applications. This self-contained book takes a visual and rigorous approach that incorporates both extensive illustrations and full proofs

Categorical Structures and Their Applications-Werner Gähler 2004 The book collects original research papers on applied categorical structures, most of which have been presented at the North-West European Category Seminar 2003 in Berlin. The spectrum of these mathematical results reflects the varied interests of Horst Herrlich OCo one of the leading category theorists of the world OCo to whom this volume is dedicated in view of his 65th birthday. The book contains applications of categorical methods in various branches of mathematics such as algebra, analysis, logic and topology, as well as fuzzy structures and computer science. At the end of the book the reader will find a complete list of Horst HerrlichOCO's publications. The proceedings have been selected for coverage in: . OCo Index to Scientific & Technical Proceedings- (ISTP- / ISI Proceedings). OCo Index to Scientific & Technical Proceedings (ISTP CDRom version / ISI Proceedings). OCo CC Proceedings OCo Engineering & Physical Sciences."

Non-Hausdorff Topology and Domain Theory-Jean Goubault-Larrecq 2013-03-28 This unique book on modern topology looks well beyond traditional treatises and explores spaces that may, but need not, be Hausdorff. This is essential for domain theory, the cornerstone of semantics of computer languages, where the Scott topology is almost never Hausdorff. For the first time in a single volume, this book covers basic material on metric and topological spaces, advanced material on complete partial orders, Stone duality, stable compactness, quasi-metric spaces and much more. An early chapter on metric spaces serves as an invitation to the topic (continuity, limits, compactness, completeness) and forms a complete introductory course by itself. Graduate students and researchers alike will enjoy exploring this treasure trove of results. Full proofs are given, as well as motivating ideas, clear explanations, illuminating examples, application exercises and some more challenging problems for more advanced readers.

Higher Topos Theory (AM-170)-Jacob Lurie 2009-07-06 Higher category theory is generally regarded as technical and forbidding, but part of it is considerably more tractable: the theory of infinity-categories, higher categories in which all higher morphisms are assumed to be invertible. In Higher Topos Theory, Jacob Lurie presents the foundations of this theory, using the language of weak Kan complexes introduced by Boardman and Vogt, and shows how existing theorems in algebraic topology can be reformulated and generalized in the theory's new language. The result is a powerful theory with applications in many areas of mathematics. The book's first five chapters give an exposition of the theory of infinity-categories that emphasizes their role as a generalization of ordinary categories. Many of the fundamental ideas from classical category theory are generalized to the infinity-categorical setting, such as limits and colimits, adjoint functors, ind-objects and pro-objects, locally accessible and presentable categories, Grothendieck fibrations, presheaves, and Yoneda's lemma. A sixth chapter presents an infinity-categorical version of the theory of Grothendieck topoi, introducing the notion of an infinity-topos, an infinity-category that resembles the infinity-category of topological spaces in the sense that it satisfies certain axioms that codify some of the basic principles of algebraic topology. A seventh and final chapter presents applications that illustrate connections between the theory of higher topoi and ideas from classical topology.

Topology for Analysis-Albert Wilansky 2008-10-17 Starting with the first principles of topology, this volume advances to general analysis. Three levels of examples and problems make it appropriate for students and professionals. Abundant exercises, ordered and numbered by degree of difficulty, illustrate important concepts, and a 40-page appendix includes tables of theorems and counterexamples. 1970 edition.

Simplicial Homotopy Theory-Paul G. Goerss 2012-12-06 Since the beginning of the modern era of algebraic topology, simplicial methods have been used systematically and effectively for both computation and basic theory. With the development of Quillen's concept of a closed model category and, in particular, a simplicial model category, this collection of methods has become the primary way to describe non-abelian homological algebra and to address homotopy-theoretical issues in a variety of fields, including algebraic K-theory. This book supplies a modern exposition of these ideas, emphasizing model category theoretical techniques. Discussed here are the homotopy theory of simplicial sets, and other basic topics such as simplicial groups, Postnikov towers, and bisimplicial sets. The more advanced material includes homotopy limits and colimits, localization with respect to a map and with respect to a homology theory, cosimplicial spaces, and homotopy coherence. Interspersed throughout are many results and ideas well-known to experts, but uncollected in the literature. Intended for second-year graduate students and beyond, this book introduces many of the basic tools of modern homotopy theory. An extensive background in topology is not assumed.

Index Analysis-R. Lowen 2015-01-06 The featured review of the AMS describes the author's earlier work in the field of approach spaces as, 'A landmark in the history of general topology'. In this book, the author has expanded this study further and taken it in a new and exciting direction. The number of conceptually and technically different systems which characterize approach spaces is increased and moreover their uniform counterpart, uniform gauge spaces, is put into the picture. An extensive study of completions, both for approach spaces and for uniform gauge spaces, as well as compactifications for approach spaces is performed. A paradigm shift is created by the new concept of index analysis. Making use of the rich intrinsic quantitative information present in approach structures, a technique is developed whereby indices are defined that measure the extent to which properties hold, and theorems become inequalities involving indices; therefore vastly extending the realm of applicability of many classical results. The theory is then illustrated in such varied fields as topology, functional analysis, probability theory, hyperspace theory and domain theory. Finally a comprehensive analysis is made concerning the categorical aspects of the theory and its links with other topological categories. Index Analysis will be useful for mathematicians working in category theory, topology, probability and statistics, functional analysis, and theoretical computer science.

Introduction to Topology-Colin Conrad Adams 2008 Learn the basics of point-set topology with the understanding of its real-world application to a variety of other subjects including science, economics, engineering, and other areas of

mathematics. KEY TOPICS: Introduces topology as an important and fascinating mathematics discipline to retain the readers interest in the subject. Is written in an accessible way for readers to understand the usefulness and importance of the application of topology to other fields. Introduces topology concepts combined with their real-world application to subjects such DNA, heart stimulation, population modeling, cosmology, and computer graphics. Covers topics including knot theory, degree theory, dynamical systems and chaos, graph theory, metric spaces, connectedness, and compactness. MARKET: A useful reference for readers wanting an intuitive introduction to topology.

Handbook of the History of General Topology-C.E. Aull 1997 This volume mainly focuses on various comprehensive topological theories, with the exception of a paper on combinatorial topology versus point-set topology by I.M. James and a paper on the history of the normal Moore space problem by P. Nyikos. The history of the following theories is given: pointfree topology, locale and frame theory (P. Johnstone), non-symmetric distances in topology (H.-P. Künzi), categorical topology and topological constructs (E. Lowen-Colebunders and B. Lowen), topological groups (M. G. Tkacenko) and finally shape theory (S. Mardesic and J. Segal). Together with the first two volumes, this work focuses on the history of topology, in all its aspects. It is unique and presents important views and insights into the problems and development of topological theories and applications of topological concepts, and into the life and work of topologists. As such, it will encourage not only further study in the history of the subject, but also further mathematical research in the field. It is an invaluable tool for topology researchers and topology teachers throughout the mathematical world.

Homotopical Topology-Anatoly Fomenko 2016-06-24 This textbook on algebraic topology updates a popular textbook from the golden era of the Moscow school of I. M. Gelfand. The first English translation, done many decades ago, remains very much in demand, although it has been long out-of-print and is difficult to obtain. Therefore, this updated English edition will be much welcomed by the mathematical community. Distinctive features of this book include: a concise but fully rigorous presentation, supplemented by a plethora of illustrations of a high technical and artistic caliber; a huge number of nontrivial examples and computations done in detail; a deeper and broader treatment of topics in comparison to most beginning books on algebraic topology; an extensive, and very concrete, treatment of the machinery of spectral sequences. The second edition contains an entirely new chapter on K-theory and the Riemann-Roch theorem (after Hirzebruch and Grothendieck).

From Categories to Homotopy Theory-Birgit Richter 2020-04-16 Category theory provides structure for the mathematical world and is seen everywhere in modern mathematics. With this book, the author bridges the gap between pure category theory and its numerous applications in homotopy theory, providing the necessary background information to make the subject accessible to graduate students or researchers with a background in algebraic topology and algebra. The reader is first introduced to category theory, starting with basic definitions and concepts before progressing to more advanced themes. Concrete examples and exercises illustrate the topics, ranging from colimits to constructions such as the Day convolution product. Part II covers important applications of category theory, giving a thorough introduction to simplicial objects including an account of quasi-categories and Segal sets. Diagram categories play a central role throughout the book, giving rise to models of iterated loop spaces, and feature prominently in functor homology and homology of small categories.

Categories for the Working Mathematician-Saunders Mac Lane 2013-04-17 An array of general ideas useful in a wide variety of fields. Starting from the foundations, this book illuminates the concepts of category, functor, natural transformation, and duality. It then turns to adjoint functors, which provide a description of universal constructions, an analysis of the representations of functors by sets of morphisms, and a means of manipulating direct and inverse limits. These categorical concepts are extensively illustrated in the remaining chapters, which include many applications of the basic existence theorem for adjoint functors. The categories of algebraic systems are constructed from certain adjoint-like data and characterised by Beck's theorem. After considering a variety of applications, the book continues with the construction and exploitation of Kan extensions. This second edition includes a number of revisions and additions, including new chapters on topics of active interest: symmetric monoidal categories and braided monoidal categories, and the coherence theorems for them, as well as 2-categories and the higher dimensional categories which have recently come into prominence.