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General Topology

Bibliotheca Mathematica: A Series of Monographs on Pure and Applied Mathematics, Volume VII: Modern General Topology focuses on the processes, operations, principles, and approaches employed in pure and applied mathematics, including spaces, cardinal and ordinal numbers, and mappings. The publication first elaborates on set, cardinal and ordinal numbers, basic concepts in topological spaces, and various topological spaces. Discussions focus on metric space, axioms of countability, compact space and paracompact space, normal space and fully normal space, subspace, product space, quotient space, and inverse limit space, convergence, mapping, and open basis and neighborhood basis. The book then ponders on compact spaces and related topics, as well as product of compact spaces, compactification, extensions of the concept of compactness, and compact space and the lattice of continuous functions. The manuscript tackles paracompact spaces and related topics, metrizable spaces and related topics, and topics related to mappings. Topics include metric space, paracompact space, and continuous mapping, theory of inverse limit space, theory of selection, mapping space, imbedding, metrizability, uniform space, countably paracompact space, and modifications of the concept of paracompactness. The book is a valuable source of data for mathematicians and researchers interested in modern general topology.

The General Topology of Dynamical Systems

"The book is an elegant piece of work, suitable as a text for the beginning student as well as pleasant and informative reading for the mature mathematician. Both the topologist and the analyst might profit from its inclusion in their libraries." — Scripta Mathematica The author's previous book on point-set topology, also translated by Professor Krieger, was widely recognized as the leading English-language work on the subject. The present volume is not just a revision of the

earlier book, but an entirely new presentation, quite different in its axiomatic treatment and inclusion of new material. In particular, this revised edition includes a large number of interesting worked and unworked examples, as well as new discussions of the cardinalities of various sets. In these pages, Professor Sierpiński, a distinguished Polish mathematician, presents a detailed theory of Fréchet (V) spaces and a comprehensive examination of their relevance to topological spaces, plus in-depth discussions of metric and complete spaces. The author's exposition is clear and refined; moreover, his axiomatic treatment of the theory of point sets, apart from its logical simplicity, has also an advantage in that it supplies excellent material for exercise in abstract thinking and logical argument in the deduction of theorems from stated suppositions alone; i.e., in proving theorems by drawing conclusions according to logic alone, and without any appeal to intuition.

Introduction to Topology

General Topology,

At the present time, the average undergraduate mathematics major finds mathematics heavily compartmentalized. After the calculus, he takes a course in analysis and a course in algebra. Depending upon his interests (or those of his department), he takes courses in special topics. Ifhe is exposed to topology, it is usually straightforward point set topology; if he is exposed to geom etry, it is usually classical differential geometry. The exciting revelations that there is some unity in mathematics, that fields overlap, that techniques of one field have applications in another, are denied the undergraduate. He must wait until he is well into graduate work to see interconnections, presumably because earlier he doesn't know enough. These notes are an attempt to break up this compartmentalization, at least in topology-geometry. What the student has learned in algebra and advanced calculus are used to prove some fairly deep results relating geometry, topol ogy, and group theory. (De Rham's theorem, the Gauss-Bonnet theorem for surfaces, the functorial relation of fundamental group to covering space, and surfaces of constant curvature as homogeneous spaces are the most note worthy examples.) In the first two chapters the bare essentials of elementary point set topology are set forth with some hint ofthe subject's application to functional analysis.

General Topology

The first half of the book provides an introduction to general topology, with ample space given to exercises and carefully selected applications. The second half of the text extends this introduction to the field of asymmetric topology, which is a field of great interest for applications in computer sciences. Recurring themes include the interactions of topology with order theory and mathematics designed to model loss-of-resolution situations.

General Topology: Chapters 5-10

This book is the first one of a work in several volumes, treating the history of the

development of topology. The work contains papers which can be classified into 4 main areas. Thus there are contributions dealing with the life and work of individual topologists, with specific schools of topology, with research in topology in various countries, and with the development of topology in different periods. The work is not restricted to topology in the strictest sense but also deals with applications and generalisations in a broad sense. Thus it also treats, e.g., categorical topology, interactions with functional analysis, convergence spaces, and uniform spaces. Written by specialists in the field, it contains a wealth of information which is not available anywhere else.

Lecture Notes on Elementary Topology and Geometry

Comprehensive text for beginning graduate-level students and professionals. "The clarity of the author's thought and the carefulness of his exposition make reading this book a pleasure." — Bulletin of the American Mathematical Society. 1955 edition.

General Topology II

This classic work has been fundamentally revised to take account of recent developments in general topology. The first three chapters remain unchanged except for numerous minor corrections and additional exercises, but chapters IV-VII and the new chapter VIII cover the rapid changes that have occurred since 1968 when the first edition appeared. The reader will find many new topics in chapters IV-VIII, e.g. theory of Wallmann-Shanin's compactification, realcompact space, various generalizations of paracompactness, generalized metric spaces, Dugundji type extension theory, linearly ordered topological space, theory of cardinal functions, dyadic space, etc., that were, in the author's opinion, mostly special or isolated topics some twenty years ago but now settle down into the mainstream of general topology.

General Topology I

Concise undergraduate introduction to fundamentals of topology — clearly and engagingly written, and filled with stimulating, imaginative exercises. Topics include set theory, metric and topological spaces, connectedness, and compactness. 1975 edition.

Recent Progress in General Topology III

Compactness is related to a number of fundamental concepts of mathemat ics. Particularly important are compact Hausdorff spaces or compacta. Com pactness appeared in mathematics for the first time as one of the main topo logical properties of an interval, a square, a sphere and any closed, bounded subset of a finite dimensional Euclidean space. Once it was realized that pre cisely this property was responsible for a series of fundamental facts related to those sets such as boundedness and uniform continuity of continuous func tions defined on them, compactness was given an abstract definition in the language of general topology reaching far beyond the class of metric spaces. This immensely extended

the realm of application of this concept (including in particular, function spaces of quite general nature). The fact, that general topology provided an adequate language for a description of the concept of compactness and secured a natural medium for its harmonious development is a major credit to this area of mathematics. The final formulation of a general definition of compactness and the creation of the foundations of the theory of compact topological spaces are due to P.S. Aleksandrov and Urysohn (see Aleksandrov and Urysohn (1971)).

Schaum's Outline of Theory and Problems of General Topology

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.

Introductory Topology

Introduction to General Topology

The book offers a good introduction to topology through solved exercises. It is mainly intended for undergraduate students. Most exercises are given with detailed solutions. In the second edition, some significant changes have been made, other than the additional exercises. There are also additional proofs (as exercises) of many results in the old section "What You Need To Know", which has been improved and renamed in the new edition as "Essential Background". Indeed, it has been considerably beefed up as it now includes more remarks and results for readers' convenience. The interesting sections "True or False" and "Tests" have remained as they were, apart from a very few changes.

Introduction to General Topology

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. Mardeŝić, 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.

Handbook of the History of General Topology

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

Topology

General Topology

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.

Modern General Topology

This book is a course in general topology, intended for students in the first year of the second cycle (in other words, students in their third univer sity year). The course was taught during the first semester of the 1979-80 academic year (three hours a week of lecture, four hours a week of guided work). Topology is the study of the notions of limit and continuity and thus is, in principle, very ancient. However, we shall limit ourselves to the origins of the theory since the nineteenth century. One of the sources of topology is the effort to clarify the theory of real-valued functions of a real variable: uniform continuity, uniform convergence, equicontinuity, Bolzano-Weierstrass theorem (this work is historically inseparable from the attempts to define with precision what the real numbers are). Cauchy was one of the pioneers in this direction, but the errors that slip into his work prove how hard it was to isolate the right concepts. Cantor came along a bit later; his researches into trigonometric series led him to study in detail sets of points of R (whence the concepts of open set and closed set in R, which in his work are intermingled with much subtler concepts). The foregoing alone does not justify the very general framework in which this course is set. The fact is that the concepts mentioned above have shown themselves to be useful for objects other than the real numbers.

General Topology

Students of topology rightly complain that much of the basic material in the subject cannot easily be found in the literature, at least not in a convenient form. In this book I have tried to take a fresh look at some of this basic material and to organize it in a coherent fashion. The text is as self-contained as I could reasonably make it and should be quite accessible to anyone who has an elementary knowledge of point-set topology and group theory. This book is based on a course of 16 graduate lectures given at Oxford and elsewhere from time to time. In a course of that length one cannot discuss too many topics without being unduly superficial. However, this was never intended as a treatise on the subject but rather as a short introductory course which will, I hope, prove useful to specialists and non-specialists alike. The introduction contains a description of the contents. No algebraic or differen tial topology is involved, although I have borne in mind the needs of students of those branches of the subject. Exercises for the reader are scattered throughout the text, while suggestions for further reading are contained in the lists of references at the end of each chapter. In most cases these lists include the main sources I have drawn on, but this is not the type of book where it is practicable to give a reference for everything.

General Topology

Fundamentals of General Topology

Encyclopedia of General Topology

This introduction to point-set topology contains material on hyperspaces, malfunctions and dimension - topics important in the study of fractal geometry and chaotic dynamics. The book also includes examples, topics and applications. It aims to motivate students to think abstractly.

General Topology

This is the softcover reprint of the 1971 English translation of the first four chapters of Bourbaki's Topologie Generale. It gives all basics of the subject, starting from definitions. Important classes of topological spaces are studied, and uniform structures are introduced and applied to topological groups. In addition, real numbers are constructed and their properties established.

Elementary Topology

This Is A Postgraduate Level Textbook, Written Specifically For Use At Universities In India And Fills A Long-Felt Need. It Has Several Welcome Features. Motivation And Heuristic Explanations Are Provided Before Introducing Many Of The Concepts; Bases And Subbases Of A Topology Are Given More Attention Than Most Books Do; Both Filters And Nets Are Treated In Great Details, And There Is Also A Discussion On The So-Called Equivalence Of The Two Concepts; Gives A Detailed Treatment Of Image And Quotient Topologies.Compactification Is Treated In Far Greater Detail Than Any Other Book, With Ample Warnings About Common Pitfalls.The Presentation Of Compactifications Is Rigorous And Yet Easier To Understand. The Chapter On Uniform Spaces Proceeds At A Pace That The Student Will Find Easier To Handle. A Large Number And A Broad Spectrum Of Exercises Are Given At The End Of Each Chapter. The Introductory Chapter Has A List Of Over A Hundred Set-Theoretic Identities Which The Student Should Find Very Handy As A Reference List. There Is An Extensive Bibliography For The Library-Oriented Student. An Excellent Index Of Keywords And Another Of Notations Make The Job Of Searching And Cross-Referencing Easy. The First Edition And The Subsequent Revised Edition Of This Book Have Been Remarkably Well Received.

An Introduction to General Topology

It contains a wealth of information concerning topological dynamics, most of which has not appeared before in such an organization and presentation. It offers to a graduate-level student a very comprehensive overview on the basic concepts in the theory of dynamical systems. --Zentralblatt MATH No other single text has heretofore presented such a unified treatment of these topological ideas at this level of generality. --Mathematical Reviews Topology, the foundation of modern analysis, arose historically as a way to organize ideas like compactness and connectedness which had emerged from analysis. Similarly, recent work in dynamical systems theory has both highlighted certain topics in the pre-existing subject of topological dynamics (such as the construction of Lyapunov functions and various notions of stability) and also generated new concepts and results (such as attractors, chain recurrence, and basic sets). This book collects these results,

both old and new, and organizes them into a natural foundation for all aspects of dynamical systems theory. No existing book is comparable in content or scope. Requiring background in point-set topology and some degree of ``mathematical sophistication'', Akin's book serves as an excellent textbook for a graduate course in dynamical systems theory. In addition, Akin's reorganization of previously scattered results makes this book of interest to mathematicians and other researchers who use dynamical systems in their work.

Elementary Topology

Originally published as 2nd edition, 1956: Toronto, Canada: University of Toronto Press. Republished by Dover Publications, 2000.

Handbook of the History of General Topology

General Topology

Geometric Aspects of General Topology

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.

General Topology and Homotopy Theory

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

General Topology

This is the first of the encyclopaedia volumes devoted to general topology. It has two parts. The first outlines the basic concepts and constructions of general

topology, including several topics which have not previously been covered in English language texts. The second part presents a survey of dimension theory, from the very beginnings to the most important recent developments. The principal ideas and methods are treated in detail, and the main results are provided with sketches of proofs. The authors have suceeded admirably in the difficult task of writing a book which will not only be accessible to the general scientist and the undergraduate, but will also appeal to the professional mathematician. The authors' efforts to detail the relationship between more specialized topics and the central themes of topology give the book a broad scholarly appeal which far transcends narrow disciplinary lines.

Foundations of General Topology

Modern General Topology

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.

General Topology

This introduction to topology provides separate, in-depth coverage of both general topology and algebraic topology. Includes many examples and figures. GENERAL TOPOLOGY. Set Theory and Logic. Topological Spaces and Continuous Functions. Connectedness and Compactness. Countability and Separation Axioms. The Tychonoff Theorem. Metrization Theorems and paracompactness. Complete Metric Spaces and Function Spaces. Baire Spaces and Dimension Theory. ALGEBRAIC TOPOLOGY. The Fundamental Group. Separation Theorems. The Seifert-van Kampen Theorem. Classification of Surfaces. Classification of Covering Spaces. Applications to Group Theory. For anyone needing a basic, thorough, introduction to general and algebraic topology and its applications.

Introduction to general topology

Topology is one of the most rapidly expanding areas of mathematical thought: while its roots are in geometry and analysis, topology now serves as a powerful tool in almost every sphere of mathematical study. This book is intended as a first text in topology, accessible to readers with at least three semesters of a calculus and analytic geometry sequence. In addition to superb coverage of the fundamentals of metric spaces, topologies, convergence, compactness, connectedness, homotopy theory, and other essentials, Elementary Topology gives added perspective as the author demonstrates how abstract topological notions developed from classical mathematics. For this second edition, numerous exercises

have been added as well as a section dealing with paracompactness and complete regularity. The Appendix on infinite products has been extended to include the general Tychonoff theorem; a proof of the Tychonoff theorem which does not depend on the theory of convergence has also been added in Chapter 7.

General Topology

This textbook on elementary topology contains a detailed introduction to general topology and an introduction to algebraic topology via its most classical and elementary segment centered at the notions of fundamental group and covering space. The book is tailored for the reader who is determined to work actively. The proofs of theorems are separated from their formulations and are gathered at the end of each chapter. This makes the book look like a pure problem book and encourages the reader to think through each formulation. A reader who prefers a more traditional style can either find the proofs at the end of the chapter or skip them altogether. This style also caters to the expert who needs a handbook and prefers formulations not overshadowed by proofs. Most of the proofs are simple and easy to discover. The book can be useful and enjoyable for readers with quite different backgrounds and interests. The text is structured in such a way that it is easy to determine what to expect from each piece and how to use it. There is core material, which makes up a relatively small part of the book. The core material is interspersed with examples, illustrative and training problems, and relevant discussions. The reader who has mastered the core material acquires a strong background in elementary topology and will feel at home in the environment of abstract mathematics. With almost no prerequisites (except real numbers), the book can serve as a text for a course on general and beginning algebraic topology.

A General Topology Workbook

Recent Progress in General Topology II

Introduction to General Topology

This book is designed for graduate students to acquire knowledge of dimension theory, ANR theory (theory of retracts), and related topics. These two theories are connected with various fields in geometric topology and in general topology as well. Hence, for students who wish to research subjects in general and geometric topology, understanding these theories will be valuable. Many proofs are illustrated by figures or diagrams, making it easier to understand the ideas of those proofs. Although exercises as such are not included, some results are given with only a sketch of their proofs. Completing the proofs in detail provides good exercise and training for graduate students and will be useful in graduate classes or seminars. Researchers should also find this book very helpful, because it contains many subjects that are not presented in usual textbooks, e.g., dim $X \times I$ = dim $X + 1$ for a metrizable space X; the difference between the small and large inductive dimensions; a hereditarily infinite-dimensional space; the ANR-ness of locally contractible countable-dimensional metrizable spaces; an infinite-dimensional

space with finite cohomological dimension; a dimension raising cell-like map; and a non-AR metric linear space. The final chapter enables students to understand how deeply related the two theories are. Simplicial complexes are very useful in topology and are indispensable for studying the theories of both dimension and ANRs. There are many textbooks from which some knowledge of these subjects can be obtained, but no textbook discusses non-locally finite simplicial complexes in detail. So, when we encounter them, we have to refer to the original papers. For instance, J.H.C. Whitehead's theorem on small subdivisions is very important, but its proof cannot be found in any textbook. The homotopy type of simplicial complexes is discussed in textbooks on algebraic topology using CW complexes, but geometrical arguments using simplicial complexes are rather easy.