Introduction To Topology Third Edition Dover Books On Mathematics

Excellent text covers vector fields, plane homology and the Jordan Curve Theorem, surfaces, homology of complexes, more. Problems and exercises. Some knowledge of differential equations and multivariate calculus required.Bibliography. 1979 edition.
Undergraduate text uses combinatorial approach to accommodate both math majors and liberal arts students. Covers the basics of number theory, offers an outstanding introduction to partitions, plus chapters on multiplicativity-divisibility, quadratic congruences, additivity, and more
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.
Classic, lively explanation of one of the byways of mathematics. Klein bottles, Moebius strips, projective planes, map coloring, problem of the Koenigsberg bridges, much more, described with clarity and wit.
Introduction to Graph Theory
An Introduction with Application to Topological Groups
An Introduction to Mathematical Thinking
A First Course in Topology

Over the last number of years powerful new methods in analysis and topology have led to the development of the modern global theory of symplectic topology, including several striking and important results. The first edition of Introduction to Symplectic Topology was published in 1995. The book was the first comprehensive introduction to the subject and became a key text in the area. A significantly revised second edition was published in 1998 introducing new sections and updates on the fast-developing area. This new third edition includes updates and new material to bring the book right up-to-date.
Students must prove all of the theorems in this undergraduate-level text, which features extensive outlines to assist in study and comprehension. Thorough and well-written, the treatment provides sufficient material for a one-year undergraduate course. The logical presentation anticipates students' questions, and complete definitions and expositions of topics relate new concepts to previously discussed subjects. Most of the material focuses on point-set topology with the exception of the last chapter. Topics include sets and functions, infinite sets and transfinite numbers, topological spaces and basic concepts, product spaces, connectivity, and compactness. Additional subjects include separation axioms, complete spaces, and homotopy and the fundamental group. Numerous hints and figures illuminate the text. Dover (2014) republication of the edition originally published by The Williams & Wilkins Company, Baltimore, 1975. See every Dover book in print at www.doverpublications.com
"Admirably meets the topology requirements for the pregraduate training of research mathematicians." — American Mathematical Monthly Topology, sometimes described as "rubber-sheet geometry," is crucial to modern mathematics and to many other disciplines — from quantum mechanics to sociology. This stimulating introduction to the field will give the student a familiarity with elementary point set topology, including an easy acquaintance with the line and the plane, knowledge often useful in graduate mathematics programs. The book is not a collection of topics, rather it early employs the language of point set topology to define and discuss topological groups. These geometric objects in turn motivate a further discussion of set-theoretic topology and of its applications in function spaces. An introduction to homotopy and the fundamental group then brings the student's new theoretical knowledge to bear on very concrete problems: the calculation of the fundamental group of the circle and a proof of the fundamental theorem of algebra. Finally, the abstract development is brought to satisfying fruition with the classification of topological groups by equivalence under local isomorphism. Throughout the book there is a sustained geometric development — a single thread of reasoning which unifies the topological course. One of the special features of this work is its well-chosen exercises, along with a selection of problems in each chapter that contain interesting applications and

further theory. Careful study of the text and diligent performance of the exercises will enable the student to achieve an excellent working knowledge of topology and a useful understanding of its applications. Moreover, the author's unique teaching approach lends an extra dimension of effectiveness to the books: "Of particular interest is the remarkable pedagogy evident in this work. The author converses with the reader on a personal basis. He speaks with him, questions him, challenges him, and — best of all — occasionally leaves him to his own devices." — American Scientist

One of the ways in which topology has influenced other branches of mathematics in the past few decades is by putting the study of continuity and convergence into a general setting. This new edition of Wilson Sutherland's classic text introduces metric and topological spaces by describing some of that influence. The aim is to move gradually from familiar real analysis to abstract topological spaces, using metric spaces as a bridge between the two. The language of metric and topological spaces is established with continuity as the motivating concept. Several concepts are introduced, first in metric spaces and then repeated for topological spaces, to help convey familiarity. The discussion develops to cover connectedness, compactness and completeness, a trio widely used in the rest of mathematics. Topology also has a more geometric aspect which is familiar in popular expositions of the subject as `rubber-sheet geometry', with pictures of Möbius bands, doughnuts, Klein bottles and the like; this geometric aspect is illustrated by describing some standard surfaces, and it is shown how all this fits into the same story as the more analytic developments. The book is primarily aimed at second- or third-year mathematics students. There are numerous exercises, many of the more challenging ones accompanied by hints, as well as a companion website, with further explanations and examples as well as material supplementary to that in the book.

Topology

Introduction to Symplectic Topology

An Introduction

Problem Textbook

Concise work presents topological concepts in clear, elementary fashion, from basics of set-theoretic topology, through topological theorems and questions based on concept of the algebraic complex, to the concept of Betti groups. Includes 25 figures.

Combining concepts from topology and algorithms, this book delivers what its title promises: an introduction to the field of computational topology. Starting with motivating problems in both mathematics and computer science and building up from classic topics in geometric and algebraic topology, the third part of the text advances to persistent homology. This point of view is critically important in turning a mostly theoretical field of mathematics into one that is relevant to a multitude of disciplines in the sciences and engineering. The main approach is the discovery of topology through algorithms. The book is ideal for teaching a graduate or advanced undergraduate course in computational topology, as it develops all the background of both the mathematical and algorithmic aspects of the subject from first principles. Thus the text could serve equally well in a course taught in a mathematics department or computer science department.

This text explains nontrivial applications of metric space topology to analysis. Covers metric space, point-set topology, and algebraic topology. Includes exercises, selected answers, and 51 illustrations. 1983 edition.

Topology is a large subject with several branches, broadly categorized as algebraic topology, point-set topology, and geometric topology. Point-set topology is the main language for a broad range of mathematical disciplines, while algebraic topology offers as a powerful tool for studying problems in geometry and numerous other areas of mathematics. This book presents the basic concepts of topology, including virtually all of the traditional topics in point-set topology, as well as elementary topics in algebraic topology such as fundamental groups and covering spaces. It also discusses topological groups and transformation groups. When combined with a working knowledge of analysis and algebra, this book offers a valuable resource for advanced undergraduate and beginning graduate students of mathematics specializing in algebraic topology and harmonic analysis.

Differential Topology

Principles of Topology

Experiments in Topology

Introduction to Set Theory and Topology

How is a subway map different from other maps? What makes a knot knotted? What makes the Mbius strip one-sided? These are questions of topology, the mathematical study of properties preserved by twisting or stretching objects. In the 20th century topology became as broad and fundamental as algebra and geometry, with important implications for science, especially physics. In this Very Short Introduction Richard Earl gives a sense of the more visual elements of topology (looking at surfaces) as well as covering the

formal definition of continuity. Considering some of the eye-opening examples that led mathematicians to recognize a need for studying topology, he pays homage to the historical people, problems, and surprises that have propelled the growth of this field. ABOUT THE SERIES: The Very Short Introductions series from Oxford University Press contains hundreds of titles in almost every subject area. These pocket-sized books are the perfect way to get ahead in a new subject quickly. Our expert authors combine facts, analysis, perspective, new ideas, and enthusiasm to make interesting and challenging topics highly readable.

Manifolds play an important role in topology, geometry, complex analysis, algebra, and classical mechanics. Learning manifolds differs from most other introductory mathematics in that the subject matter is often completely unfamiliar. This introduction guides readers by explaining the roles manifolds play in diverse branches of mathematics and physics. The book begins with the basics of general topology and gently moves to manifolds, the fundamental group, and covering spaces.

Manifolds, the higher-dimensional analogs of smooth curves and surfaces, are fundamental objects in modern mathematics. Combining aspects of algebra, topology, and analysis, manifolds have also been applied to classical mechanics, general relativity, and quantum field theory. In this streamlined introduction to the subject, the theory of manifolds is presented with the aim of helping the reader achieve a rapid mastery of the essential topics. By the end of the book the reader should be able to compute, at least for simple spaces, one of the most basic topological invariants of a manifold, its de Rham cohomology. Along the way, the reader acquires the knowledge and skills necessary for further study of geometry and topology. The requisite point-set topology is included in an appendix of twenty pages; other appendices review facts from real analysis and linear algebra. Hints and solutions are provided to many of the exercises and problems. This work may be used as the text for a one-semester graduate or advanced undergraduate course, as well as by students engaged in self-study. Requiring only minimal undergraduate prerequisites, 'Introduction to Manifolds' is also an excellent foundation for Springer's GTM 82, 'Differential Forms in Algebraic Topology'.

Algebraandtopology,thetwofundamentaldomainsofmathematics,playcomplem- tary roles. Topology studies continuity and convergence and provides a general framework to study the concept of a limit. Much of topology is devoted to handling in?nite sets and in?nity itself; the methods developed are qualitative and, in a certain sense, irrational. -gebra studies all kinds of operations and provides a basis for algorithms and calculations. Very often, the methods here are ?nitistic in nature. Because of this difference in nature, algebra and topology have a strong tendency to develop independently, not in direct contact with each other. However, in applications, in higher level domains of mathematics, such as functional analysis, dynamical systems, representation theory, and others, topology and algebra come in contact most naturally. Many of the most important objects of mathematics represent a blend of algebraic and of topologicalstructures. Topologicalfunctionspacesandlineartopologicalspacesingeneral, topological groups and topological ?elds, transformation groups, topological lattices are objects of this kind. Very often an algebraic structure and a topology come naturally together; this is the case when they are both determined by the nature of the elements of the set considered (a group of transformations is a typical example). The rules that describe the relationship between a topology and an algebraic operation are almost always transparentandnatural—theoperationhastobecontinuous,jointlyorseparately.

Algebraic Topology

Number Theory

Introduction to Metric and Topological Spaces

From Geometry to Topology

Originally published: Philadelphia: Saunders College Publishing, 1989; slightly corrected.

"Topology of Metric Spaces gives a very streamlined development of a course in metric space topology emphasizing only the most useful concepts, concrete spaces and geometric ideas to encourage geometric thinking, to treat this as a preparatory ground for a general topology course, to use this course as a surrogate for real analysis and to help the students gain some perspective of modern analysis." "Eminently suitable for self-study, this book may also be used as a supplementary text for courses in general (or point-set) topology so that students will acquire a lot of concrete examples of spaces and maps."--BOOK JACKET.

This book provides a concise introduction to topology and is necessary for courses in differential geometry, functional analysis, algebraic topology, etc. Topology is a fundamental tool in most branches of pure mathematics and is also omnipresent in more applied parts of mathematics. Therefore students will need fundamental topological notions already at an early stage in their bachelor programs. While there are already many excellent monographs on general topology, most of them are too large for a first bachelor course. Topology fills this gap and can be either used for self-study or as the basis of a topology course.

This concise, undergraduate-level text focuses on combinatorics, graph theory with applications to some standard network optimization problems, and algorithms. More than 200 exercises, many with complete solutions. 1991 edition.

Pure and Applied

Introduction to Piecewise-Linear Topology

Computational Topology

Elementary Concepts of Topology

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.

Aimed at "the mathematically traumatized," this text offers nontechnical coverage of graph theory, with exercises. Discusses planar graphs, Euler's formula, Platonic graphs, coloring, the genus of a graph, Euler walks, Hamilton walks, more. 1976 edition.

The fundamental concepts of general topology are covered in this text whic can be used by students with only an elementary background in calculus. Chapters cover: sets; functions; topological spaces; subspaces; and homeomorphisms.

Highly regarded for its exceptional clarity, imaginative and instructive exercises, and fine writing style, this concise book offers an ideal introduction to the fundamentals of topology. Originally conceived as a text for a one-semester course, it is directed to undergraduate students whose studies of calculus sequence have included definitions and proofs of theorems. The book's principal aim is to provide a simple, thorough survey of elementary topics in the study of collections of objects, or sets, that possess a mathematical structure. The author begins with an informal discussion of set theory in Chapter 1, reserving coverage of countability for Chapter 5, where it appears in the context of compactness. In the second chapter Professor Mendelson discusses metric spaces, paying particular attention to various distance functions which may be defined on Euclidean n-space and which lead to the ordinary topology. Chapter 3 takes up the concept of topological space, presenting it as a generalization of the concept of a metric space. Chapters 4 and 5 are devoted to a discussion of the two most important topological properties: connectedness and compactness. Throughout the text, Dr. Mendelson, a former Professor of Mathematics at Smith College, has included many challenging and stimulating exercises to help students develop a solid grasp of the material presented.

Introduction to Geometry and Topology

Third Edition

Exercises and Solutions

Second Edition

"A very valuable book. In little over 200 pages, it presents a well-organized and surprisingly comprehensive treatment of most of the basic material in differential topology, as far as is accessible without the methods of algebraic topology....There is an abundance of exercises, which supply many beautiful examples and much interesting additional information, and help the reader to become thoroughly familiar with the material of the main text." —MATHEMATICAL REVIEWS

Introductory text for first-year math students uses intuitive approach, bridges the gap from familiar concepts of geometry to topology. Exercises and Problems. Includes 101 black-and-white illustrations. 1974 edition.

This book provides an introduction to topology, differential topology, and differential geometry. It is based on manuscripts refined through use in a variety of lecture courses. The first chapter covers elementary results and concepts from point-set topology. An exception is the Jordan Curve Theorem, which is proved for polygonal paths and is intended to give students a first glimpse into the nature of deeper topological problems. The second chapter of the book introduces manifolds and Lie groups, and examines a wide assortment of examples. Further discussion explores tangent bundles, vector bundles, differentials, vector fields, and Lie brackets of vector fields. This discussion is deepened and expanded in the third chapter, which introduces the de Rham cohomology and the oriented integral and gives proofs of the Brouwer Fixed-Point Theorem, the Jordan-Brouwer Separation Theorem, and Stokes's integral formula. The fourth and final chapter is devoted to the fundamentals of differential geometry and traces the development of ideas from curves to submanifolds of Euclidean spaces. Along the way, the book discusses connections and curvature--the central concepts of differential geometry. The discussion culminates with the Gauß equations and the version of Gauß's theorema egregium for submanifolds of arbitrary dimension and codimension. This book is primarily aimed at advanced undergraduates in mathematics and physics and is intended as the template for a one- or two-semester bachelor's course.

Classroom-tested and much-cited, this concise text is designed for undergraduates. It offers a valuable and instructive introduction to the basic concepts of topology, taking an intuitive rather than an axiomatic viewpoint. 1962 edition.

A Combinatorial Introduction to Topology

Basic Topology

Point Set Topology

Introduction to Topological Manifolds

Superb one-year course in classical topology. Topological spaces and functions, point-set topology, much more. Examples and problems. Bibliography. Index.

Introduction to Set Theory and Topology describes the fundamental concepts of set theory and topology as well as its applicability to analysis, geometry, and other branches of mathematics, including algebra and probability theory. Concepts such as inverse limit, lattice, ideal, filter, commutative diagram, quotient-spaces, completely regular spaces, quasicomponents, and cartesian products of topological spaces are considered. This volume consists of 21 chapters organized into two sections and begins with an introduction to set theory, with emphasis on the propositional calculus and its application to propositions each having one of two logical values, 0 and 1. Operations on sets which are analogous to arithmetic operations are also discussed. The chapters that follow focus on the mapping concept, the power of a set, operations on cardinal numbers, order relations, and well ordering. The section on topology explores metric and topological spaces, continuous mappings, cartesian products, and other spaces such as spaces with a countable base, complete spaces, compact spaces, and connected spaces. The concept of dimension, simplexes and their properties, and cuttings of the plane are also analyzed. This book is intended for students and teachers of mathematics.

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.

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. 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. A useful reference for readers wanting an intuitive introduction to topology.

An Introduction to Manifolds

Introductory Discrete Mathematics

Elementary Topology

Introduction to Topology and Geometry

Suitable for a complete course in topology, this text also functions as a self-contained treatment for independent study. Additional enrichment materials make it equally valuable as a reference. 1964 edition.

In this broad introduction to topology, the author searches for topological invariants of spaces, together with techniques for their calculating. Students with knowledge of real analysis, elementary group theory, and linear algebra will quickly become familiar with a wide variety of techniques and applications involving point-set, geometric, and algebraic topology. Over 139 illustrations and more than 350 problems of various difficulties help students gain a thorough understanding of the subject.

This textbook in point set topology is aimed at an upper-undergraduate audience. Its gentle pace will be useful to students who are still learning to write proofs. Prerequisites include calculus and at least one semester of analysis, where the student has been properly exposed to the ideas of basic set theory such as subsets, unions, intersections, and functions, as well as convergence and other topological notions in the real line. Appendices are included to bridge the gap between this new material and material found in an analysis course. Metric spaces are one of the more prevalent topological spaces used in other areas and are therefore introduced in the first chapter and emphasized throughout the text. This also conforms to the approach of the book to start with the particular and work toward the more general. Chapter 2 defines and develops abstract topological spaces, with metric spaces as the source of inspiration, and with a focus on Hausdorff spaces. The final chapter concentrates on continuous real-valued functions, culminating in a development of paracompact spaces.

An introductory textbook suitable for use in a course or for self-study, featuring broad coverage of the subject and a readable exposition, with many examples and exercises.

Intuitive Concepts in Elementary Topology

Introductory Topology

Topology of Metric Spaces

Topological Groups and Related Structures, An Introduction to Topological Algebra.

The first five chapters of this book form an introductory course in piece wise-linear topology in which no assumptions are made other than basic topological notions. This course would be suitable as a second course in topology with a geometric flavour, to follow a first course in point-set topology, andi)erhaps to be given as a final year undergraduate course. The whole book gives an account of handle theory in a piecewise linear setting and could be the basis of a first year postgraduate lecture or reading course. Some results from algebraic topology are needed for handle theory and these are collected in an appendix. In a second appen dix are listed the properties of Whitehead torsion which are used in the s-cobordism theorem. These appendices should enable a reader with only basic knowledge to complete the book. The book is also intended to form an introduction to modern geo metric topology as a research subject, a bibliography of research papers being included. We have omitted acknowledgements and references from the main text and have collected these in a set of "historical notes" to be found after the appendices.

An easily accessible introduction to over three centuries of innovations in geometry Praise for the First Edition ". . . a welcome alternative to compartmentalized treatments bound to the old thinking. This clearly written, well-illustrated book supplies sufficient background to be self-contained." —CHOICE This fully revised new edition offers the most comprehensive coverage of modern geometry currently available at an introductory level. The book strikes a welcome balance between academic rigor and accessibility, providing a complete and cohesive picture of the science with an unparalleled range of topics. Illustrating modern mathematical topics, Introduction to Topology and Geometry, Second Edition discusses introductory topology, algebraic topology, knot theory, the geometry of surfaces, Riemann geometries, fundamental groups, and differential geometry, which opens the doors to

a wealth of applications. With its logical, yet flexible, organization, the Second Edition: • Explores historical notes interspersed throughout the exposition to provide readers with a feel for how the mathematical disciplines and theorems came into being • Provides exercises ranging from routine to challenging, allowing readers at varying levels of study to master the concepts and methods • Bridges seemingly disparate topics by creating thoughtful and logical connections • Contains coverage on the elements of polytope theory, which acquaints readers with an exposition of modern theory Introduction to Topology and Geometry, Second Edition is an excellent introductory text for topology and geometry courses at the upper-undergraduate level. In addition, the book serves as an ideal reference for professionals interested in gaining a deeper understanding of the topic.
Contents: Introduction. - Fundamental Concepts. - Topological Vector Spaces.- The Quotient Topology. - Completion of Metric Spaces. - Homotopy. - The Two Countability Axioms. - CW-Complexes. - Construction of Continuous Functions on Topological Spaces. - Covering Spaces. - The Theorem of Tychonoff. - Set Theory (by T. Br|cker). - References. - Table of Symbols. -Index.
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