Topology

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PRESTON ANTONY

Algebraic Topology World Scientific
The purpose of this collection is to guide the non-specialist through the basic theory of various generalizations of topology, starting with clear motivations for their introduction. Structures considered include closure spaces, convergence spaces, proximity spaces, quasi-uniform spaces, merotopic spaces, nearness and filter spaces, semi-uniform convergence spaces, and approach spaces. Each chapter is self-contained and accessible to the graduate student, and focuses on motivations to introduce the generalization of topologies considered, presenting examples where desirable properties are not present in the realm of topologies and the problem is remedied in the more general context. Then, enough material will be covered to prepare the reader for more advanced papers on the topic. While category theory is not the focus of the book, it is a convenient language to study these structures and, while kept as a tool rather than an object of study, will be used throughout the book. For this reason, the book contains an introductory chapter on categorical topology.
Topology Via Logic Elsevier
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.

Singularities and Topology of Hypersurfaces Cambridge University Press

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.

Elementary Concepts of Topology MIT Press

This rapid and concise presentation of the essential ideas and results of algebraic topology follows the axiomatic foundations pioneered by Eilenberg and Steenrod. The approach of the book is pragmatic: while most proofs are given, those that are particularly long or technical are omitted, and results are stated in a form that emphasizes practical use over maximal generality. Moreover, to better reveal the logical structure of the subject, the separate roles of algebra and topology are illuminated. Assuming a background in point-set topology, Fundamentals of Algebraic Topology covers the canon of a first-year graduate course in algebraic topology: the fundamental group and covering spaces, homology and cohomology, CW complexes and manifolds, and a short introduction to homotopy theory. Readers wishing to deepen their knowledge of algebraic topology beyond the fundamentals are guided by a short but carefully annotated bibliography.

Understanding Topology American Mathematical Soc.

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.

Computational Topology for Data Analysis IT Revolution

Topology is a branch of pure mathematics that deals with the abstract relationships found in geometry and analysis. Written with the mature student in mind, Foundations of Topology, Second Edition, provides a user-friendly, clear, and concise introduction to this fascinating area of mathematics. The author introduces topics that are well motivated with thorough proofs that make them easy to follow. Historical comments are dispersed throughout the text, and exercises, varying in degree of difficulty, are found at the end of each chapter. Foundations of Topology is an excellent text for teaching students how to develop the skill to write clear and precise proofs.

Algebraic Topology JHU Press

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.

Elementary Concepts of Topology Springer Science & Business Media

Point Set Topology

General Topology Springer

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 includes topics in asymmetric topology, a field motivated by applications in computer science. Recurring themes include the interactions of topology with order theory and mathematics designed to model loss-of-resolution situations.

Quantum Topology Springer Science & Business Media

Lefschetz's Topology was written in the period in between the beginning of topology, by Poincare, and the establishment of algebraic topology as a well-formed subject, separate from point-set or geometric topology. At this time, Lefschetz had already proved his first fixed-point theorems. In some sense, the present book is a description of the broad subject of topology into which Lefschetz's theory of fixed points fits. Lefschetz takes the opportunity to describe some of the important applications of his theory, particularly in algebraic geometry, to problems such as counting intersections of algebraic varieties. He also gives applications to vector distributions, complex spaces, and Kronecker's characteristic theory.

Topology and Geometry Cambridge University Press

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

Team Topologies Academic Press

From the very beginning, algebraic topology has developed under the influ ence of the problems posed by trying to understand the topological properties of complex algebraic varieties (e.g., the pioneering work by Poincare and Lefschetz). Especially in the work of Lefschetz [Lf2], the idea is made explicit that singularities are important in the study of the topology even in the case of smooth varieties. What is known nowadays about the topology of smooth and singular vari eties is quite impressive. The many existing results may be roughly divided into two classes as follows: (i) very general results or theories, like stratified Morse theory and (mixed) Hodge theory, see, for instance, Goresky-MacPherson [GM], Deligne [Del], and Steenbrink [S6]; and (ii) specific topics of great subtlety and beauty, like the study of the funda mental group of the complement in [p>2 of a singular plane curve initiated by Zariski or Griffiths' theory relating the rational differential forms to the Hodge filtration on the middle cohomology group of a smooth projec tive hypersurface. The aim of this book is precisely to introduce the reader to some topics in this latter class. Most of the results to be discussed, as well as the related notions, are at least two decades old, and specialists use them intensively and freely in their work. Nevertheless, it is impossible to find an adequate intro duction to this subject, which gives a good feeling for its relations with other parts of algebraic geometry and topology.

Introduction to Topology Walter de Gruyter GmbH & Co KG

A clear exposition, with exercises, of the basic ideas of algebraic topology. Suitable for a two-semester course at the beginning graduate level, it assumes a knowledge of point set topology and basic algebra. Although categories and functors are introduced

early in the text, excessive generality is avoided, and the author explains the geometric or analytic origins of abstract concepts as they are introduced.

Differential Topology American Mathematical Soc.

This textbook is an alternative to a classical introductory book in point-set topology. The approach, however, is radically different from the classical one. It is based on convergence rather than on open and closed sets. Convergence of filters is a natural generalization of the basic and well-known concept of convergence of sequences, so that convergence theory is more natural and intuitive to many, perhaps most, students than classical topology. On the other hand, the framework of convergence is easier, more powerful and far-reaching which highlights a need for a theory of convergence in various branches of analysis. Convergence theory for filters is gradually introduced and systematically developed. Topological spaces are presented as a special subclass of convergence spaces of particular interest, but a large part of the material usually developed in a topology textbook is treated in the larger realm of convergence spaces.

Geometry, Topology and Physics Courier Corporation

Now in paperback, Topology via Logic is an advanced textbook on topology for computer scientists. Based on a course given by the author to postgraduate students of computer science at Imperial College, it has three unusual features. First, the introduction is from the locale viewpoint, motivated by the logic of finite observations: this provides a more direct approach than the traditional one based on abstracting properties of open sets in the real line. Second, the methods of locale theory are freely exploited. Third, there is substantial discussion of some computer science applications. Although books on topology aimed at mathematics exist, no book has been written specifically for computer scientists. As computer scientists become more aware of the mathematical foundations of their discipline, it is appropriate that such topics are presented in a form of direct relevance and applicability. This book goes some way towards bridging the gap.

Topology American Mathematical Soc.

Detailed theory of Fré chet (V) spaces and a comprehensive examination of their relevance to topological spaces, plus in-depth discussions of metric and complete spaces. For beginning students and mature mathematicians. Second edition.

Introduction to Topology American Mathematical Soc.

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.

Fundamentals of Algebraic Topology American Mathematical Society

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.

General Topology Cambridge University Press

Comprehensive coverage of elementary general topology as well as algebraic topology, specifically 2-manifolds, covering spaces and fundamental groups. Problems, with selected solutions. Bibliography. 1975 edition.

Essentials of Topology with Applications Springer Science & Business Media

Differential Topology provides an elementary and intuitive introduction to the study of smooth manifolds. In the years since its first publication, Guillemin and Pollack's book has become a standard text on the subject. It is a jewel of mathematical exposition, judiciously picking exactly the right mixture of detail and generality to display the richness within. The text is mostly self-contained, requiring only undergraduate analysis and linear algebra. By relying on a unifying idea--transversality--the authors are able to avoid the use of big machinery or ad hoc techniques to establish the main results. In this way, they present intelligent treatments of important theorems, such as the Lefschetz fixed-point theorem, the Poincaré-Hopf index theorem, and Stokes theorem. The book has a wealth of exercises of various types. Some are routine explorations of the main material. In others, the students are guided step-by-step through proofs of fundamental results, such as the Jordan-Brouwer separation theorem. An exercise section in Chapter 4 leads the student through a construction of de Rham cohomology and a proof of its homotopy invariance. The book is suitable for either an introductory graduate course or an advanced undergraduate course.