

Algebraic Topology Homework

Adrian Hatcher's "Algebraic Topology"

Part A

1. The second homology of $\mathbb{R}P^2$ is a quotient of a certain quotient of $\mathbb{Z}$. Compute $H_2(\mathbb{R}P^2)$ by finding all the subgroups of $\mathbb{Z}$. $H_2(\mathbb{R}P^2)$ is a quotient of $\mathbb{Z}$ by a subgroup of $\mathbb{Z}$.

$$\begin{array}{ccc} \mathbb{Z} & \xrightarrow{\partial_2} & \mathbb{Z} \\ \downarrow & & \downarrow \\ \mathbb{Z} & \xrightarrow{\partial_2} & \mathbb{Z} \end{array}$$

Use this exact sequence to find $H_2(\mathbb{R}P^2)$ and $H_1(\mathbb{R}P^2)$. Use the exactness of the exact sequence $H_2(\mathbb{R}P^2) \rightarrow H_1(\mathbb{R}P^2) \rightarrow H_0(\mathbb{R}P^2) \rightarrow 0$ to find $H_1(\mathbb{R}P^2)$.

2. The second homology of $\mathbb{R}P^2$ is a quotient of a certain quotient of $\mathbb{Z}$. Compute $H_2(\mathbb{R}P^2)$ by finding all the subgroups of $\mathbb{Z}$. $H_2(\mathbb{R}P^2)$ is a quotient of $\mathbb{Z}$ by a subgroup of $\mathbb{Z}$.

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Use this exact sequence to find $H_2(\mathbb{R}P^2)$ and $H_1(\mathbb{R}P^2)$.

3. Show that the homomorphism $H_2(\mathbb{R}P^2) \rightarrow H_1(\mathbb{R}P^2)$ is an isomorphism. $H_2(\mathbb{R}P^2) \cong H_1(\mathbb{R}P^2)$.

Use the exact sequence $H_2(\mathbb{R}P^2) \rightarrow H_1(\mathbb{R}P^2) \rightarrow H_0(\mathbb{R}P^2) \rightarrow 0$ to find $H_1(\mathbb{R}P^2)$.

4. Compute $H_2(\mathbb{R}P^2)$ and $H_1(\mathbb{R}P^2)$ by finding all the subgroups of $\mathbb{Z}$. $H_2(\mathbb{R}P^2)$ is a quotient of $\mathbb{Z}$ by a subgroup of $\mathbb{Z}$.

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Scientific and Technical Aerospace Reports, 1976 Science Citation Index, 1992 Vols for 1964 have guides and journal lists

Algebraic Topology George A. Duckett, 2016-05-18 If you have a question about Algebraic Topology this is the book with the answers Algebraic Topology Questions and Answers takes some of the best questions and answers asked on the mathoverflow stackexchange com website You can use this book to look up commonly asked questions browse questions on a particular topic compare answers to common topics check out the original source and much more This book has been designed to be very easy to use with many internal references set up that makes browsing in many different ways possible Topics covered include Homotopy Theory Geometric Topology Algebraic Geometry Reference Request Differential Geometry Stable Homotopy Category Theory General Topology Cohomology K Theory Homology Homology Differential Topology Vector Bundles Group Theory Homological Algebra Characteristic Classes Simplicial Stuff and many more *Algebraic Topology: A Structural Introduction* Marco Grandis, 2021-12-24 Algebraic Topology is a system and strategy of partial translations aiming to reduce difficult topological problems to algebraic facts that can be more easily solved The main subject of this book is singular homology the simplest of these translations Studying this theory and its applications we also investigate its underlying structural layout the topics of Homological Algebra Homotopy Theory and Category Theory which occur in its foundation This book is an introduction to a complex domain with references to its advanced parts and ramifications It is written with a moderate amount of prerequisites basic general topology and little else and a moderate progression starting from a very elementary beginning A consistent part of the exposition is organised in the form of exercises with suitable hints and solutions It can be used as a textbook for a semester course or self study and a guidebook for further study Algebraic Topology: An Intuitive Approach Hajime Satō, 1999 Develops an introduction to algebraic topology mainly through simple examples built on cell complexes Topics covers include homeomorphisms topological spaces and cell complexes homotopy homology cohomology the universal coefficient theorem fiber bundles and vector bundles and spectral sequences Includes chapter summaries exercises and answers Includes an appendix of definitions in sets topology and groups Originally published in Japanese by Iwanami Shoten Publishers Tokyo 1996 Annotation copyrighted by Book News Inc Portland OR

Algebraic topology J. F. Adams, 1973 **Elements Of Algebraic Topology** James R. Munkres, 1996-01-01 Elements of Algebraic Topology provides the most concrete approach to the subject With coverage of homology and cohomology theory universal coefficient theorems Kunneth theorem duality in manifolds and applications to classical theorems of point set topology this book is perfect for communicating complex topics and the fun nature of algebraic topology for beginners

Lectures On Algebraic Topology Haynes R Miller, 2021-09-20 Algebraic Topology and basic homotopy theory form a fundamental building block for much of modern mathematics These lecture notes represent a culmination of many years of leading a two semester course in this subject at MIT The style is engaging and student friendly but precise Every lecture is

accompanied by exercises It begins slowly in order to gather up students with a variety of backgrounds but gains pace as the course progresses and by the end the student has a command of all the basic techniques of classical homotopy theory

Algebraic Topology Clark Bray, Adrian Butscher, Simon Rubinstein-Salzedo, 2021-06-18 Algebraic Topology is an introductory textbook based on a class for advanced high school students at the Stanford University Mathematics Camp SUMaC that the authors have taught for many years Each chapter or lecture corresponds to one day of class at SUMaC The book begins with the preliminaries needed for the formal definition of a surface Other topics covered in the book include the classification of surfaces group theory the fundamental group and homology This book assumes no background in abstract algebra or real analysis and the material from those subjects is presented as needed in the text This makes the book readable to undergraduates or high school students who do not have the background typically assumed in an algebraic topology book or class The book contains many examples and exercises allowing it to be used for both self study and for an introductory undergraduate topology course

Lectures on Algebraic Topology Sergei Vladimirovich Matveev, 2006 Algebraic topology is the study of the global properties of spaces by means of algebra It is an important branch of modern mathematics with a wide degree of applicability to other fields including geometric topology differential geometry functional analysis differential equations algebraic geometry number theory and theoretical physics This book provides an introduction to the basic concepts and methods of algebraic topology for the beginner It presents elements of both homology theory and homotopy theory and includes various applications The author's intention is to rely on the geometric approach by appealing to the reader's own intuition to help understanding The numerous illustrations in the text also serve this purpose Two features make the text different from the standard literature first special attention is given to providing explicit algorithms for calculating the homology groups and for manipulating the fundamental groups Second the book contains many exercises all of which are supplied with hints or solutions This makes the book suitable for both classroom use and for independent study

Algebraic Topology C. R. F. Maunder, 1970

Algebraic Topology and Related Topics Mahender Singh, Yongjin Song, Jie Wu, 2019-02-02 This book highlights the latest advances in algebraic topology from homotopy theory braid groups configuration spaces and toric topology to transformation groups and the adjoining area of knot theory It consists of well written original research papers and survey articles by subject experts most of which were presented at the 7th East Asian Conference on Algebraic Topology held at the Indian Institute of Science Education and Research IISER Mohali Punjab India from December 1 to 6 2017 Algebraic topology is a broad area of mathematics that has seen enormous developments over the past decade and as such this book is a valuable resource for graduate students and researchers working in the field

Algebraic Topology Colloquium on Algebraic Topology, 1962

Algebraic Topology, 1973

Elements of Algebraic Topology James R. Munkres, Steven G. Krantz, Harold R. Parks, 2025-05-27 This classic text appears here in a new edition for the first time in four decades The new edition with the aid of two new authors brings it up to date for a new

generation of mathematicians and mathematics students Elements of Algebraic Topology provides the most concrete approach to the subject With coverage of homology and cohomology theory universal coefficient theorems Kunneth theorem duality in manifolds and applications to classical theorems of point set topology this book is perfect for communicating complex topics and the fun nature of algebraic topology for beginners This second edition retains the essential features of the original book Most of the notation and terminology are the same There are some useful additions There is a new introduction to homotopy theory A new Index of Notation is included Many new exercises are added Algebraic topology is a cornerstone of modern mathematics Every working mathematician should have at least an acquaintance with the subject This book which is based largely on the theory of triangulations provides such an introduction It should be accessible to a broad cross section of the profession both students and senior mathematicians Students should have some familiarity with general topology

Algebraic Topology Allen Hatcher, 2002 In most mathematics departments at major universities one of the three or four basic first year graduate courses is in the subject of algebraic topology This introductory textbook in algebraic topology is 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 The four main chapters present the basic material of the subject fundamental group and covering spaces homology and cohomology higher homotopy groups and homotopy theory generally The author emphasizes the geometric aspects of the subject which helps students gain intuition A unique feature of the book is the inclusion of many optional topics which are not usually part of a first course due to time constraints and for which elementary expositions are sometimes hard to find Among these are Bockstein and transfer homomorphisms direct and inverse limits H spaces and Hopf algebras the Brown representability theorem the James reduced product the Dold Thom theorem and a full exposition of Steenrod squares and powers Researchers will also welcome this aspect of the book **Lectures on Algebraic Topology** Marvin J. Greenberg, 1971 Algebraic Topology Wolfgang Franz, 1968 Algebraic Topology , 1977-01-01 **Algebraic Topology** Edwin Henry Spanier, 195?

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