Book Review

A BASIC COURSE IN ALGEBRAIC TOPOLOGY

Graduate Texts in Mathematics 127

William S. Massey

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Reviewed by Graham Ellis

In the minds of many people, algebraic topology is a subject which is "esoteric, specialized, and disjoint from the overall sweep of mathematical thought." This straightforward introduction to the subject, by a recognized authority, aims to dispel that point of view by emphasizing: (i) the geometric motivation for the various concepts and: (ii) the applications to other areas. The book, which is stripped of all unnecessary technicalities, would be a nice text for a one-year MSc course for students with a basic knowledge of point-set topology and group theory. It consists of updated material from the first 5 chapters of the author's earlier book *Algebraic Topology: An Introduction* (GTM 56) together with an updated version of almost all of his book *Singular Homology Theory* (GTM 70).

Chapter I is a 31-page partial account of the classification of compact surfaces. The following 5 chapters contain a thorough introduction to the fundamental group and covering spaces. Chapter VI explains how problems in 19th century analysis motivated the development of homology theory. (There is an appendix at the end of the book, intended for readers with a knowledge of differentiable manifolds, in which De Rham's theorem is proved.) The remaining 9 chapters are devoted to singular homology theory and cohomology theory. In order to simplify proofs Massey has chosen to develop these theories cubically rather than simplicially. Chapter XIV contains the Poincaré duality theorems for manifolds, as well as the Alexander duality theorem and the Lefschetz-Poincaré duality theorem for manifolds with boundary. Chapter XV treats the Hopf invariant of a map from a $(2n - 1)$-sphere onto an n-sphere.

Graham Ellis
University College
Galway