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978-0-521-29864-3 - A First Course in Algebraic Topology

Czes Kosniowski

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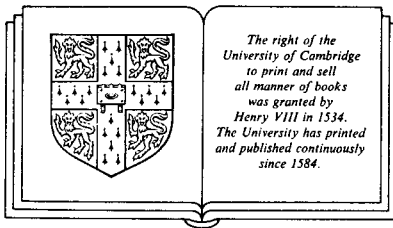
A first course in algebraic topology

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A FIRST COURSE IN
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PREFACE

This book provides a variety of self-contained introductory courses on algebraic topology for the average student. It has been written with a geometric flavour and is *profusely illustrated* (after all, topology is a branch of geometry). Abstraction has been avoided as far as possible and in general a pedestrian approach has been taken in introducing new concepts. The prerequisites have been kept to a minimum and no knowledge of point set or general topology is assumed, making it especially suitable for a first course in topology with the main emphasis on algebraic topology. Using this book, a lecturer will have much freedom in designing an undergraduate or low level postgraduate course.

Throughout the book there are numerous exercises of varying degree to aid and tax the reader. It is, of course, advisable to do as many of these exercises as possible. However, it is not necessary to do any of them, because rarely at any stage is it assumed that the reader has solved the exercises; if a solution to an exercise is needed in the text then it is usually given.

The contents of this book contain topics from topology and algebraic topology selected for their ‘teachability’; these are possibly the more elegant parts of the subject. Ample suggestions for further reading are given in the last chapter.

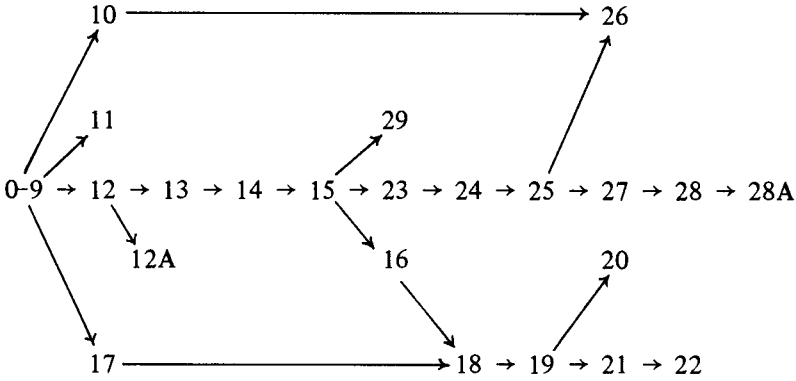
Roughly one-quarter of the book is on general topology and three-quarters on algebraic topology. The general topology part of the book is not presented with its usual pathologies. Sufficient material is covered to enable the reader to quickly get to the ‘interesting’ part of topology. In the algebraic topology part, the main emphasis is on the fundamental group of a space. Students tend to grasp the concept of the fundamental group readily and it provides a good introduction to what algebraic topology is about. The theory of covering spaces and the Seifert–Van Kampen theorem are covered in detail and both are used to calculate fundamental groups. Other topics include manifolds and surfaces, the Jordan curve theorem (as an appendix to

Preface

Chapter 12), the theory of knots and an introductory chapter on singular homology.

As this book is about topology, and not the history of topology, names and dates have not always been included.

This book should not necessarily be read in a linear fashion. The following chart shows the approximate interdependence of the various chapters. For example, to understand Chapter 18 completely you ought to have read Chapters 0-9, 12-16 and 17 beforehand.



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