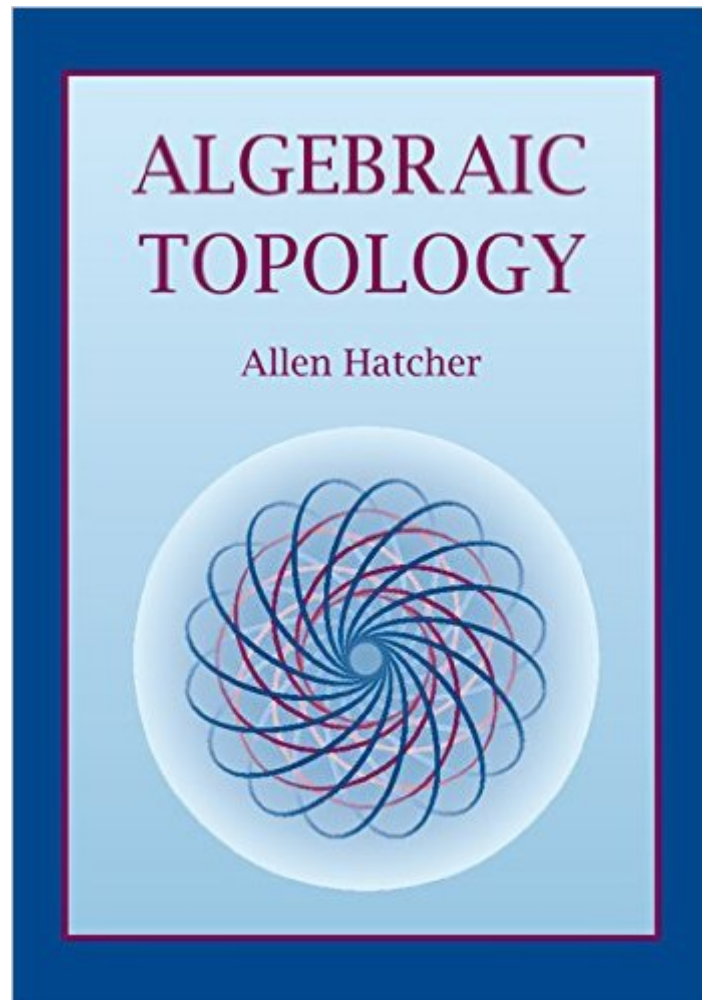


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Algebraic Topology



Synopsis

In most major universities one of the three or four basic first-year graduate mathematics courses is algebraic topology. This introductory text is suitable for use in a course on the subject or for self-study, featuring broad coverage and a readable exposition, with many examples and exercises. The four main chapters present the basics: 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 is the inclusion of many optional topics not usually part of a first course due to time constraints: 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 Steenrod squares and powers.

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Customer Reviews

Allen Hatcher has gone to great lengths in order to create a text which, albeit overly verbose, can be used as a gentle introduction to modern Algebraic Topology. Why 'modern'? Compare this text with the tried and tested texts of Spanier, Munkres as well as May and, almost immediately, you will see what I mean. The obvious example is Hatcher's use of CW-complexes as opposed to the more traditional build up beginning with simplices. For the die-hard mathematician who enjoys less fluff, this book is not for you and, in particular, if this is your first venture in Algebraic Topology, you enjoy

the theorem-proof-theorem style with a light sprinkling of explanation, then I would recommend J.J. Rotman's text. Whereas, if you enjoy filler, background information, and lots of side-notes or examples, then Hatcher's text would be a perfect fit. Myself, I fall into the category of those who enjoy the more terse texts but, I purchased Hatcher's (the hardcover) because of the clarity and precision found in the proofs. The majority of other texts have a tendency to obfuscate the underlying meaning that should be understood by the up-and-coming mathematician. Of course this approach has its merits since, in particular, it forces the reader to fill in the blanks but, as a matter of insight, Hatcher's approach is also beneficial. Another positive strength of Hatcher's text lies in the fact that he effectively breaks the subject into its prime sub-categories in such a way that the reader can begin with either of the four parts of the text without having to rely too much on previous sections. This novel feature allows someone interested in, say, Cohomology to pick up and begin learning about Cohomology without having to waste time making their way through material they are not interested in.

This book is intended as an "introduction to algebraic topology" and I rated the book accordingly. I found the book refreshing at points and thoroughly frustrating at other points. This was one of the first books I approached when trying to learn formal algebraic topology. Prior to reading it I had indirect exposure to algebraic topology in application to physics especially when learning about differential forms where one is usually exposed to homology cohomology and de Rham cohomology, etc. I found the physics texts MUCH more instructive than this text which is supposed to be from the mathematician's perspective. The book has its merits: 1) it is organized well and attempts to relate the main topics in algebraic topology - homotopy and homology 2) it has many examples to help solidify the concept presented 3) it has plenty of exercises of varying difficulty. 4) it genuinely tries to motivate the mathematical ideas of algebraic topology. However it has many faults. I was particularly disturbed by its lack of definitions. At some point I felt like I was having a conversation or reading a "pop" math book for the dilettante not mathematician. I found myself repeatedly going back and having to REREAD THE TEXT to get the definition of some mathematical object. In my humble opinion a math text should clearly state definitions and properties and not try to "explain" them in prose without the preceding definitions. The author also states minimal prerequisites (algebra and point set topology), however, it is clear a lot more is needed. Although there are plenty of examples, the author, simply states conclusions which maybe "self-evident" to someone with previous exposure to algebraic topology but not to a novice.

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