is very clear, the book is self-contained and easy to read, and it should be extremely valuable to researchers interested in applied analysis and mathematical models in elasticity.

B. ZHANG

Lee, J. M. *Introduction to topological manifolds* (Graduate Texts in Mathematics, vol. 202, Springer, 2000), xvii+385 pp., 0 387 95026 5 (softback) £24, 0 387 98759 2 (hardback) £48.

This book provides a very readable introduction to manifolds at the beginning graduate level. It grew out of notes used in the first third of a year-long course taught by the author at the University of Washington; the remaining two thirds focuses on smooth manifolds. Because of this, the book has a very strong geometric flavour, quite uniquely among introductory texts on general and algebraic topology. Its aim is to provide the necessary amount of topological knowledge needed for the further study of manifolds, reflecting the author's belief that manifolds are part of the basic vocabulary of mathematics and need to be part of the education of every student of mathematics. The geometric slant of the book is clearly seen in its contents.

The introductory first chapter discusses some disciplines in which manifolds came to play a prominent role, including classical mechanics, general relativity and quantum field theory. The next three chapters provide a brief and selective introduction to general topology: topological spaces; subspaces, products and quotients; connectedness and compactness. Manifolds are the main examples.

Chapter 5 introduces simplicial complexes and such concepts as orientability and Euler characteristic. Triangulability theorems are also discussed here (with a complete proof for 1-manifolds and a sketch of a proof for surfaces). These are used in Chapter 6 to classify 1-manifolds and compact surfaces.

Chapters 7–10 introduce basic notions of homotopy theory with particular emphasis on the fundamental group. This section includes a brief introduction to group theory (Chapter 9) and the proof and applications of the Seifert–Van Kampen theorem (Chapter 10).

Chapters 10 and 11 are on covering spaces and covering groups. The examples are particularly interesting here: classifying coverings of tori and lens spaces, and proving that surfaces of higher genus are covered by the hyperbolic disk.

Chapter 13, the last, gives a brief but illuminating introduction to homology theory, mainly singular. The essential properties of homology groups proved here include homotopy invariance and the Mayer–Vietoris theorem.

The reviewer found this a well-written and enjoyable book. It is an excellent precursor to the study of differential geometry, but it will also be useful as an introduction to algebraic topology. There is a wealth of examples, exercises and problems, as well as many illustrations emphasizing the geometric intuition behind concepts and proofs. A small number of typographical and minor errors will be found (the errata can be downloaded from the author's home page at the University of Washington).

R. BIELAWSKI

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