Choice

51-0331   QA326   MARC

Gallier, Jean. **A guide to the classification theorem for compact surfaces**, by Jean Gallier and Dianna Xu. Springer, 2013. 178p index afp ISBN 9783642343636, $49.95; ISBN 9783642343643 ebook, $39.95

The clichéd popular description of topology as the branch of mathematics that equates doughnuts with coffee cups refers narrowly to a specialization, namely, the classification of manifolds, and more specifically to the two-dimensional slice of that story. This special topic nevertheless possesses fundamental importance in algebraic geometry, complex analysis, and graph theory, and paradigmatic importance within topology. Adding the monster-barring hypothesis "compact" makes the classification theorem classical and complete. Though many advanced texts on algebraic topology or Riemann surfaces rigorously establish the theorem via sophisticated machinery, the informal presentation in, say, L. Christine Kinsey's *Topology of Surfaces* (CH, Nov'94, 32-1584) targets undergraduates. This highly focused book by Gallier (Univ. of Pennsylvania) and Xu (Bryn Mawr College) does both, delivering rigor to undergraduates by developing minimal doses of homotopy and homology theory, and without even presuming familiarity with group theory. Getting the full story requires reading the appendixes, which contain both preliminaries and deferred technical arguments. Another appendix even treats triangulation of surface, as in B. Mohar and C. Thomassen's approach in *Graphs on Surfaces* (CH, Apr'02, 39-4635). The present careful treatment of a major result that draws from several branches of mathematics makes the book an excellent resource for a capstone course. **Summing Up**: Highly recommended. Upper-division undergraduates and above.

--D. V. Feldman, University of New Hampshire

Related Articles

SCIENCE & TECHNOLOGY – Mathematics
Mohar, Bojan and Thomassen, Carsten
  Graphs on surfaces
  Choice April 2002 39:39-4635; doi:10.5860/CHOICE.39-4635
  Extract   Full Text

SCIENCE & TECHNOLOGY – Mathematics
Kinsey, L Christine
  Topology of surfaces
  Choice November 1994 32:32-1584; doi:10.5860/CHOICE.32-1584
  Extract   Full Text