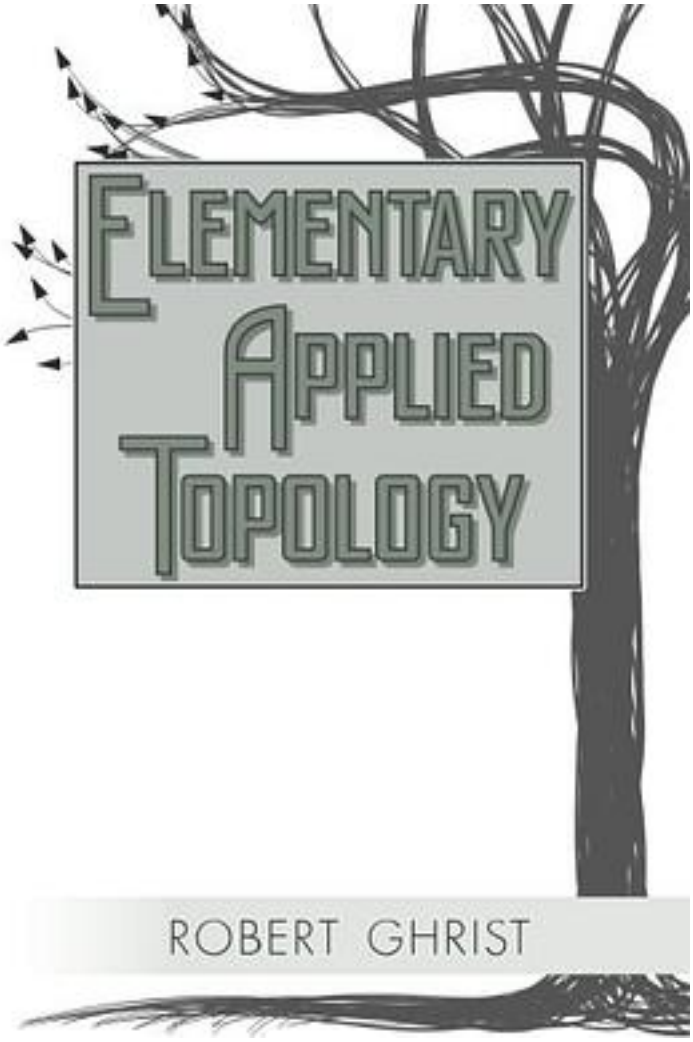
Elementary Applied Topology



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This text gives a brisk and engaging introduction to the mathematics behind the

recently established field of Applied Topology. Over a century of development of principles and techniques in algebraic topology has of late crossed over to a variety of application domains. This text gives a completely novel introduction to these methods in the context of the applications. "Elementary Applied Topology" is short (250 pp. plus bibliography and index) and richly illustrated, with 268 figures. It is perfect for both self-study, and as the basis for a course in applied topology. This book is also well-suited for use as a supplementary text in a more traditional algebraic topology course, providing both context and motivation for the tools to be learned. The progression of mathematical techniques is a fresh approach. The book begins with a quick trip through manifolds and cell complexes. The segue to algebraic topology comes in the form of the Euler characteristic and the Euler calculus born from it. Passing from this to homology, exact sequences, and cohomology sets the stage for the innovative content to come. This is comprised of modern Morse theory (including discrete Morse theory, Conley index, and stratified Morse theory), sheaf theory (with an emphasis on cellular sheaves and cosheaves), and, finally, category theory and categorification. Every tool and topic is paired with an application. These range in scope across the biological, economic, engineering, material, physical, and statistical sciences. Of particular note are the applications to topological data analysis, including persistent homology and barcodes. "Elementary Applied Topology" is the first comprehensive text on applied algebraic topology for students of all mathematical sciences.

作者介绍:

Robert Ghrist is the Andrea Mitchell PIK Professor of Mathematics and Electrical & Systems Engineering at the University of Pennsylvania. He is a celebrated researcher in Applied Mathematics whose achievements were recognized by President Bush in 2004 [PECASE award] and by Scientific American magazine in 2007 [Top50 for research]. Among his honors is the 2013 Chauvenet Prize, the highest award given for expository writing in mathematics. As a teacher, he is renowned for illustrating difficult mathematics cleanly and clearly, as evidenced by the popularity of his animated on-line "Calculus: Single Variable" video course.

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标签

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topology

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评论

Robert Ghirst是我见过最会可视化的教授 整本书光图例就令人叹为观止
另外他个人维护的YouTube channel真的是宝藏channel
https://www.youtube.com/c/ProfGhristMath

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书评

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