DESCRIPTION

Discover a unique and modern treatment of topology employing a cross-disciplinary approach

Implemented recently to understand diverse topics, such as cell biology, superconductors, and robot motion, topology has been transformed from a theoretical field that highlights mathematical theory to a subject that plays a growing role in nearly all fields of scientific investigation. Moving from the concrete to the abstract, Topology and Its Applications displays both the beauty and utility of topology, first presenting the essentials of topology followed by its emerging role within the new frontiers in research.

Filling a gap between the teaching of topology and its modern uses in real-world phenomena, Topology and Its Applications is organized around the mathematical theory of topology, a framework of rigorous theorems, and clear, elegant proofs.

This book is the first of its kind to present applications in computer graphics, economics, dynamical systems, condensed matter physics, biology, robotics, chemistry, cosmology, material science, computational topology, and population modeling, as well as other areas of science and engineering. Many of these applications are presented in optional sections, allowing an instructor to customize the presentation.

The author presents a diversity of topological areas, including point-set topology, geometric topology, differential topology, and algebraic/combinatorial topology. Topics within these areas include:

• Open sets
• Compactness
• Homotopy
• Surface classification
• Index theory on surfaces
• Manifolds and complexes
• Topological groups
• The fundamental group and homology

Special "core intuition" segments throughout the book briefly explain the basic intuition essential to understanding several topics. A generous number of figures and examples, many of which come from applications such as liquid crystals, space probe data, and computer graphics, are all available from the publisher's Web site.

ABOUT THE AUTHOR

WILLIAM F. BASENER, PhD, is an Assistant Professor in the Department of Mathematics and Statistics at Rochester Institute of Technology in Rochester, New York. He received his PhD in mathematics in 2001 from Boston University. His research interests include dynamical systems, differential equations, applied topology, economics, and the topology of manifolds. Dr. Basener is the recipient of numerous teaching awards.

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