

Boolean Representations of Simplicial Complexes and Matroids: Unlocking the Secrets of Discrete Mathematics

In the realm of mathematics, where abstraction and structure intertwine, simplicial complexes and matroids stand as fundamental concepts that underpin a vast array of applications in areas such as topology, combinatorics, and optimization. Boolean representations play a pivotal role in unlocking the intricate properties and relationships within these mathematical objects.

"Boolean Representations of Simplicial Complexes and Matroids" is a comprehensive and authoritative work that delves into the depths of this fascinating subject. Written by renowned experts in the field, this book provides a thorough exploration of the interplay between Boolean algebra and these fundamental structures.

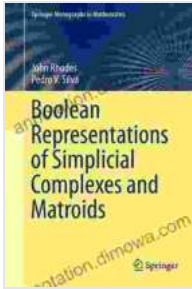
Boolean algebra, with its binary operations and underlying set theory, forms the bedrock of discrete mathematics. It provides a powerful framework for representing and manipulating logical statements, sets, and other discrete objects. In the context of simplicial complexes and matroids, Boolean representations harness the power of Boolean algebra to uncover hidden structures and relationships.

Boolean Representations of Simplicial Complexes and Matroids (Springer Monographs in Mathematics)

by Gregory M. Fahy

★★★★★ 5 out of 5

Language : English



File size : 3467 KB
Screen Reader : Supported
Print length : 183 pages
X-Ray for textbooks : Enabled



Simplicial complexes arise from the study of triangulations, where geometric objects are decomposed into simpler building blocks called simplices. These complexes capture the essence of topological spaces, providing a combinatorial representation of their connectivity and fundamental properties.

Boolean representations of simplicial complexes offer a convenient and insightful way to understand their abstract nature. By associating each simplex with a Boolean variable, these representations enable the application of Boolean operations to explore the relationships between simplices and reveal intricate topological features.

Matroids generalize the concept of linear independence in vector spaces, providing a powerful abstraction for modeling dependencies in various contexts. They find applications in areas as diverse as graph theory, network optimization, and coding theory.

Boolean representations of matroids provide a bridge between the abstract world of matroids and the concrete realm of Boolean algebra. By representing matroid elements as Boolean variables, researchers can

leverage Boolean techniques to analyze the structure and properties of matroids.

"Boolean Representations of Simplicial Complexes and Matroids" covers a wide range of topics, including:

- Combinatorial properties of simplicial complexes and matroids
- Boolean representation theorems and their applications
- Matroid intersection, union, and duality
- Applications in topology, combinatorics, and optimization

The book showcases the power of Boolean representations in solving challenging problems in a variety of mathematical disciplines. It provides valuable insights for researchers, students, and practitioners alike.

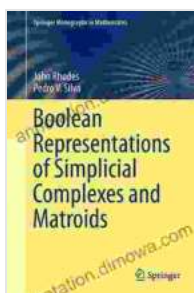
The book is authored by a team of leading experts in the field:

- **Anders Björner:** A renowned mathematician known for his fundamental contributions to combinatorics and algebraic geometry.
- **Michelle L. Wachs:** A distinguished mathematician specializing in matroid theory and its applications in combinatorics and optimization.
- **Gérard X. Zhou:** An accomplished scholar in discrete mathematics, with expertise in Boolean representations and matroid theory.

"Boolean Representations of Simplicial Complexes and Matroids" is an essential resource for anyone seeking to deepen their understanding of these fundamental mathematical concepts. Its thorough treatment, coupled

with the authors' exceptional expertise, makes it an invaluable guide for researchers, students, and practitioners alike.

Whether you are exploring the intricacies of simplicial complexes, unraveling the structure of matroids, or harnessing Boolean representations to solve complex problems, this book is your indispensable companion. Delve into its pages and discover the hidden connections that shape the world of discrete mathematics.



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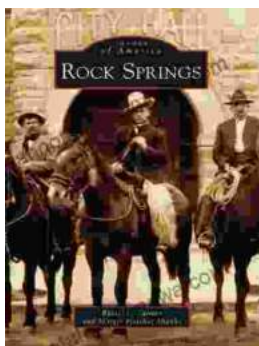
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