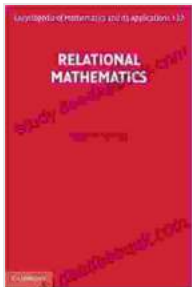# Relational Mathematics: Encyclopedia of Mathematics and Its Applications 132

Relational mathematics is a branch of mathematics that studies relations, which are mathematical objects that represent relationships between sets. Relations are used to model a wide variety of phenomena in mathematics, computer science, and other fields. The Encyclopedia of Mathematics and Its Applications, Volume 132, provides a comprehensive overview of relational mathematics, covering topics such as:

* The foundations of relational mathematics * The different types of relations * The properties of relations * The operations that can be performed on relations * The applications of relations

Relational Mathematics (Encyclopedia of Mathematics and its Applications Book 132) by Gunther Schmidt

★★★★★ 5 out of 5

Language   : English
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Print length : 582 pages

The Foundations of Relational Mathematics

The foundations of relational mathematics are based on the concept of a set. A set is a collection of distinct objects. The objects in a set are called elements. Relations are then defined as subsets of the Cartesian product of

two sets. The Cartesian product of two sets A and B is the set of all ordered pairs (a, b) where a is an element of A and b is an element of B.

The Different Types of Relations

There are many different types of relations. The most common types of relations are:

* Equivalence relations: An equivalence relation is a relation that is reflexive, symmetric, and transitive. * Order relations: An order relation is a relation that is reflexive, transitive, and antisymmetric. * Partial order relations: A partial order relation is a relation that is reflexive, transitive, and anti-reflexive.

The Properties of Relations

Relations have a number of properties that can be used to classify them. The most important properties of relations are:

* Reflexivity: A relation is reflexive if every element of the set is related to itself. * Symmetry: A relation is symmetric if whenever a is related to b, then b is related to a. * Transitivity: A relation is transitive if whenever a is related to b and b is related to c, then a is related to c. * Anti-reflexivity: A relation is anti-reflexive if no element of the set is related to itself. * Asymmetry: A relation is asymmetric if whenever a is related to b, then b is not related to a.

The Operations that Can Be Performed on Relations

There are a number of operations that can be performed on relations. The most common operations are:

* Union: The union of two relations is the set of all elements that are related to either relation. * Intersection: The intersection of two relations is the set of all elements that are related to both relations. * Complement: The complement of a relation is the set of all elements that are not related to the relation. * Inverse: The inverse of a relation is the relation that is obtained by reversing the order of the elements in each ordered pair.

The Applications of Relations

Relations have a wide variety of applications in mathematics, computer science, and other fields. Some of the most common applications of relations include:

* Modeling relationships between objects * Representing data in databases * Defining orderings on sets * Solving problems in graph theory * Developing algorithms for computer science

Relational mathematics is a powerful tool that can be used to model a wide variety of phenomena. The Encyclopedia of Mathematics and Its Applications, Volume 132, provides a comprehensive overview of relational mathematics, making it an essential resource for anyone who wants to learn more about this important topic.
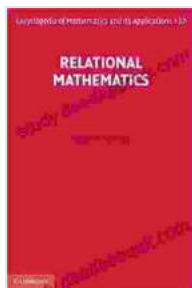
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