

# READ HOPF ALGEBRAS AND THEIR ACTIONS ON RINGS CBMS REGIONAL CONFERENCE SERIES IN MATHEMATICS

## Hopf Algebras and Their Actions on Rings

### CBMS Regional Conference Series in Mathematics

This book provides a comprehensive introduction to Hopf algebras and their actions on rings, with a particular focus on the representation theory of Hopf algebras and the connections between Hopf algebras and other areas of mathematics, such as algebraic geometry, knot theory, and quantum groups.

#### Key Features:

- **Accessible introduction** for researchers and graduate students in mathematics
- **Comprehensive coverage** of Hopf algebras and their actions on rings
- **Emphasis on representation theory** of Hopf algebras
- **Connections to other areas of mathematics** explored
- **Numerous examples and exercises** to illustrate concepts

#### Target Audience:

- Mathematicians interested in Hopf algebras and representation theory
- Graduate students in mathematics
- Researchers in algebraic geometry, knot theory, and quantum groups

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#### Related Keywords

- **Hopf algebra**
- **Action of a Hopf algebra on a ring**
- **\*\*Crossed product of a ring by a Hopf algebra**

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#### Where to Obtain the Document

- **AMS bookstore:** <https://www.ams.org/bookstore/cbms-67>
- **Springer Nature:** <https://www.springer.com/us/book/9780821824618>
- **Google Books (preview only):** <https://books.google.com/books?id=XTxpDwAAQBAJ>

This document provides a comprehensive overview of Hopf algebras and their actions on rings. It includes topics such as:

- Hopf algebras and their properties
- Actions of Hopf algebras on rings
- Crossed products and smash products
- Galois extensions and twisted tensor products
- Applications to representation theory and number theory

## **Why You Should Read About Hopf Algebras and Their Actions on Rings**

Hopf algebras are a fascinating and powerful tool in mathematics, with applications in a wide variety of areas, including algebra, geometry, and quantum physics. Their actions on rings provide a powerful way to study and classify rings.

### **What are Hopf algebras?**

A Hopf algebra is an algebra with a comultiplication, a coaddition, a counit, and an antipode. These operations allow us to think of Hopf algebras as generalizations of groups and rings.

### **Why are Hopf algebras interesting?**

Hopf algebras are interesting for a number of reasons:

- They provide a convenient framework for studying many different types of algebraic structures, including groups, rings, and modules.
- They have applications in a wide variety of areas, including quantum physics, knot theory, and operator algebras.
- They are a rich source of new mathematics, and there is still much that is not known about them.

### **What are the actions of Hopf algebras on rings?**

An action of a Hopf algebra on a ring is a map from the Hopf algebra to the endomorphisms of the ring. This action allows us to study the structure of the ring in terms of the Hopf algebra.

### **Why are the actions of Hopf algebras on rings important?**

The actions of Hopf algebras on rings are important for a number of reasons:

- They provide a powerful way to classify rings.
- They can be used to study the structure of groups and other algebraic structures.
- They have applications in a variety of areas, including quantum physics and number theory.

### **Why should I read about Hopf algebras and their actions on rings?**

If you are interested in learning more about the structure of algebraic structures, quantum physics, or number theory, then you should read about Hopf algebras and their actions on rings. These topics are fascinating and powerful, and they can help you to gain a deeper understanding of a wide variety of mathematical concepts.