

<<群₁的表示与群₁的特征>>

图书基本信息

书名：<<群₁的表示与群₁的特征>>

13位ISBN编号：9787510004582

10位ISBN编号：7510004586

出版时间：2009-5

出版公司：世界图书出版公司

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页数：458

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前言

We have attempted in this book to provide a leisurely introduction to the representation theory of groups. But why should this subject interest you?

Representation theory is concerned with the ways of writing a group as a group of matrices. Not only is the theory beautiful in its own right, but it also provides one of the keys to a proper understanding of finite groups. For example, it is often vital to have a concrete description of a particular group; this is achieved by finding a representation of the group as a group of matrices. Moreover, by studying the different representations of the group, it is possible to prove results which lie outside the framework of representation theory. One simple example: all groups of order p^2 (where p is a prime number) are abelian; this can be shown quickly using only group theory, but it is also a consequence of basic results about representations. More generally, all groups of order p^2q (p and q primes) are soluble; this again is a statement purely about groups, but the best proof, due to Burnside, is an outstanding example of the use of representation theory. In fact, the range of applications of the theory extends far beyond the boundaries of pure mathematics, and includes theoretical physics and chemistry - we describe one such application in the last chapter. The book is suitable for students who have taken first undergraduate courses involving group theory and linear algebra. We have included two preliminary chapters which cover the necessary background material. The basic theory of representations is developed in Chapters 3-23, and our methods concentrate upon the use of modules; although this accords with the more modern style of algebra, in several instances our proofs differ from those found in other textbooks. The main results are elegant and surprising.

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内容概要

Representation theory is concerned with the ways of writing a group as a group of matrices. Not only is the theory beautiful in its own right, but it also provides one of the keys to a proper understanding of finite groups. For example, it is often vital to have a concrete description of a particular group; this is achieved by finding a representation of the group as a group of matrices. Moreover, by studying the different representations of the group, it is possible to prove results which lie outside the framework of representation theory. One simple example: all groups of order p^2 (where p is a prime number) are abelian; this can be shown quickly using only group theory, but it is also a consequence of basic results about representations.

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