

Cambridge Mathematical Textbooks

Second Edition

Representations and Characters of Groups

Now in its second edition, this text provides a modern introduction to the representation theory of finite groups. The authors have revised the popular first edition and added a considerable amount of new material. The theory is developed in terms of modules, since this is appropriate for more advanced work, but considerable emphasis is placed upon constructing characters. The character tables of many groups are given, including all groups of order less than 32, and all simple groups of order less than 1000.

Among the applications covered are Burnside's $p^a q^b$ theorem, the use of character theory in studying subgroup structure and permutation groups, and a description of how to use representation theory to investigate molecular vibration.

Each chapter is accompanied by a variety of exercises, and full solutions to all the exercises are provided at the end of the book. This will be ideal as a text for a course in representation theory, and, in view of the applications of the subject, will be of interest to mathematicians, chemists and physicists alike.

CAMBRIDGE
UNIVERSITY PRESS
www.cambridge.org

ISBN 978-0-521-00392-6



9 780521 003926 >



<i>Preface</i>	<i>page</i> vii
1 Groups and homomorphisms	1
2 Vector spaces and linear transformations	14
3 Group representations	30
4 FG -modules	38
5 FG -submodules and reducibility	49
6 Group algebras	53
7 FG -homomorphisms	61
8 Maschke's Theorem	70
9 Schur's Lemma	78
10 Irreducible modules and the group algebra	89
11 More on the group algebra	95
12 Conjugacy classes	104
13 Characters	117
14 Inner products of characters	133
15 The number of irreducible characters	152
16 Character tables and orthogonality relations	159
17 Normal subgroups and lifted characters	168
18 Some elementary character tables	179
19 Tensor products	188
20 Restriction to a subgroup	210
21 Induced modules and characters	224
22 Algebraic integers	244
23 Real representations	263
24 Summary of properties of character tables	283
25 Characters of groups of order pq	288
26 Characters of some p -groups	298
27 Character table of the simple group of order 168	311

vi	<i>Representations and characters of groups</i>	
28	Character table of $GL(2, q)$	322
29	Permutations and characters	337
30	Applications to group theory	348
31	Burnside's Theorem	361
32	An application of representation theory to molecular vibration	367
	<i>Solutions to exercises</i>	397
	<i>Bibliography</i>	454
	<i>Index</i>	455