Contents

Preface xi

Part I, Chapter G: General Group Theory
A. Introduction 1
1. Notation 2
2. Some $\mathcal{K}$-Group Conditions 4
B. Semisimple Subgroups 6
3. Components and the Generalized Fitting Subgroup 6
4. π-Components and π-Layers 16
5. $L_{p'}$-Balance and p^*-Groups 23
6. p-Terminality 34
7. Semirigidity 45
8. The Permutation Action of p-Groups on Components 48
C. Nilpotent Groups and Their Extensions 53
9. Modules, Representations, and Cohomology 53
10. Small p-Groups 61
11. Automorphisms of p-Groups and Coprime Action 72
12. p-Constrained Groups 78
13. Solvable Components and Solvable L-Balance 79
14. Goldschmidt-O'Nan Modules 85
D. Fusion and Normal Subgroups 89
15. Abelian Normal Subgroups and Quotients 89
16. Local Control of Fusion 96
E. Uniqueness Subgroups 101
17. Strongly p-Embedded Subgroups and Involutions 101
18. Preuniqueness Subgroups and Standard Components 106
F. The Analysis of Signalizers 110
19. The Bender Method 110
20. The Signalizer Functor Method: k-Balance 118
21. The Signalizer Functor Method: Signalizer Functors 122
22. The Signalizer Functor Method: Connectivity 125
23. Signalizers, p-Constraint and Transitivity Theorems 129
G. Subgroups of Parabolic Type 134
24. The Klinger-Mason Method 135
25. p-Stability and Quadratic Modules 140
26. Thompson Factorization 147
27. Near Components 157
28. The Amalgam Method 161

H. Some Recognition Issues 169
29. Defining Amalgams 170
30. Split BN-Pairs 174
31. Extensions of Extra-special 2-Groups 183
I. Characters and Counting 188
32. Ordinary Character Theory 188
33. Modular Character Theory 195
34. Involutions and Counting Arguments 198
Background References 203
Expository References 204
Glossary 207
Index 210