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Nota di contenuto	Frontmatter -- Contents -- List of definitions and notations -- Foreword -- Preface -- Introduction -- §1. Groups with a cyclic subgroup of index p. Frattini subgroup. Varia -- §2. The class number, character degrees -- §3. Minimal classes -- §4. p-groups with cyclic Frattini subgroup -- §5. Hall's enumeration principle -- §6. q'-automorphisms of q-groups -- §7. Regular p-groups -- §8. Pyramidal p-groups -- §9. On p-groups of maximal class -- §10. On abelian subgroups of p-groups -- §11. On the power structure of a p-group -- §12. Counting theorems for p-groups of maximal class -- §13. Further counting theorems -- §14. Thompson's critical subgroup -- §15. Generators of p-groups -- §16. Classification of finite p-groups all of whose noncyclic subgroups are normal -- §17. Counting theorems for regular p-groups -- §18. Counting theorems for irregular p-groups -- §19. Some additional counting theorems -- §20. Groups with small abelian subgroups and partitions -- §21. On the Schur multiplier and the commutator subgroup -- §22. On characters of p-groups -- §23. On subgroups of given exponent -- §24. Hall's theorem on normal subgroups of given exponent -- §25. On the lattice of subgroups of a group -- §26. Powerful p-groups -- §27. p-groups with normal centralizers of all elements -- §28. p-groups with a uniqueness condition for nonnormal subgroups -- §29. On isoclinism

-- §30. On p-groups with few nonabelian subgroups of order pp and exponent p -- §31. On p-groups with small p0-groups of operators -- §32. W. Gaschütz's and P. Schmid's theorems on p-automorphisms of p-groups -- §33. Groups of order pm with automorphisms of order pm-1, pm-2 or pm-3 -- §34. Nilpotent groups of automorphisms -- §35. Maximal abelian subgroups of p-groups -- §36. Short proofs of some basic characterization theorems of finite p-group theory -- §37. MacWilliams' theorem -- §38. p-groups with exactly two conjugate classes of subgroups of small orders and exponentp > 2 -- §39. Alperin's problem on abelian subgroups of small index -- §40. On breadth and class number of p-groups -- §41. Groups in which every two noncyclic subgroups of the same order have the same rank -- §42. On intersections of some subgroups -- §43. On 2-groups with few cyclic subgroups of given order -- §44. Some characterizations of metacyclic p-groups -- §45. A counting theorem for p-groups of odd order -- Appendix 1. The Hall-Petrescu formula -- Appendix 2. Mann's proof of monomiality of p-groups -- Appendix 3. Theorems of Isaacs on actions of groups -- Appendix 4. Freiman's number-theoretical theorems -- Appendix 5. Another proof of Theorem 5.4 -- Appendix 6. On the order of p-groups of given derived length -- Appendix 7. Relative indices of elements of p-groups -- Appendix 8. p-groups withabsolutely regular Frattini subgroup -- Appendix 9. On characteristic subgroups of metacyclic groups -- Appendix 10. On minimal characters of p-groups -- Appendix 11. On sums of degrees of irreducible characters -- Appendix 12. 2-groups whose maximal cyclic subgroups of order > 2 are self-centralizing -- Appendix 13. Normalizers of Sylow p-subgroups of symmetric groups -- Appendix 14. 2-groups with an involution contained in only one subgroup of order 4 -- Appendix 15. A criterion for a group to be nilpotent -- Research problems and themes I -- Backmatter

Sommario/riassunto

This is the first of three volumes of a comprehensive and elementary treatment of finite p-group theory. Topics covered in this monograph include: (a) counting of subgroups, with almost all main counting theorems being proved, (b) regular p-groups and regularity criteria, (c) p-groups of maximal class and their numerous characterizations, (d) characters of p-groups, (e) p-groups with large Schur multiplier and commutator subgroups, (f) (p-1)-admissible Hall chains in normal subgroups, (g) powerful p-groups, (h) automorphisms of p-groups, (i) p-groups all of whose nonnormal subgroups are cyclic, (j) Alperin's problem on abelian subgroups of small index. The book is suitable for researchers and graduate students of mathematics with a modest background on algebra. It also contains hundreds of original exercises (with difficult exercises being solved) and a comprehensive list of about 700 open problems.