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Symmetric local algebras and small blocks of finite groups. (English) Zbl 0567.20007
J. Algebra 88, 190-195 (1984).

A familiar problem in modular representation theory is to determine the numbers of ordinary and modular irreducible characters belonging to a p -block B of a finite group G with defect group D . The author tackles the opposite question of classifying (in a special case) the defect group D by the numbers of ordinary and modular irreducible characters in B . Theorem: Let B be a block of the finite group G having only one modular and ≤ 4 ordinary irreducible characters. Then the order of the defect group D of B is equal to the number of ordinary irreducible characters in B (hence D is cyclic or a Klein four group).

The proof does not use Dade's and Brauer's classifications of the blocks with cyclic or Klein four group defect groups. Rather it is a consequence (using a result of Brauer) of the following property of symmetric local algebras. Theorem: Let A be a symmetric algebra having a one-dimensional radical factor algebra and a centre of dimension ≤ 4 . Then A is commutative.

Reviewer: W.Hamernik

MSC:

- 20C20 Modular representations and characters
- 20C05 Group rings of finite groups and their modules (group-theoretic aspects)
- 16S34 Group rings
- 20D60 Arithmetic and combinatorial problems involving abstract finite groups

Cited in **2** Reviews
Cited in **9** Documents

Keywords:

modular irreducible characters; defect group; block of the finite group; ordinary irreducible characters; order of the defect group; symmetric local algebras

Full Text: [DOI](#)

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