Hiss, Gerhard
On the decomposition numbers of $G_2(q)$. (English) ｜Zbl 0667.20009｜
J. Algebra 120, No. 2, 339-360 (1989).

Let $G = G_2(q)$ where q is a power of p. The r-blocks of G and the Brauer trees for r-blocks with cyclic defect groups where r is a prime not equal to 2, 3 or p were computed by *J. Shamash* [J. Algebra 123, 378-396 (1989); Commun. Algebra (to appear)]. In this paper the author investigates the decomposition matrices for r-blocks with non-cyclic defect groups, i.e. r-blocks of maximal defect where r divides q-1 or $q + 1$. The decomposition numbers are determined completely when r divides q-1 (Theorem A). When r divides $q+1$ they are determined up to some ambiguities (Theorem B). The method involves constructing projective characters of G by inducing from r'-subgroups or by tensoring defect 0 characters with ordinary characters, and then computing scalar products of the projective characters with characters in the given block. An interesting result is that the component of the Gelfand-Graev representation (which is projective for the prime r) which lies in a given r-block is always indecomposable. (Remark. The r-blocks of G for $r = 3$ are studied by the author and *J. Shamash* [in 3-blocks and 3- modular characters of $G_2(q)$, Preprint, RWTC Aachen].)

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MSC:

20C20	Modular representations and characters
20G05	Representation theory for linear algebraic groups

Cited in **3** Reviews
Cited in **30** Documents

Keywords:

r-blocks; Brauer trees; decomposition matrices; defect groups; decomposition numbers; projective characters; Gelfand-Graev representation

Software:

Maple

Full Text: DOI

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