Vertices and Brauer characters of solvable groups

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ABSTRACT

Let φ be an irreducible Brauer character of a p-solvable group G, and assume that there exists a subgroup U of G and an irreducible Brauer character α of U such that $\alpha^G = \varphi$ and α has p'-degree. A vertex Q of φ is defined to be any Sylow p-subgroup of U. It is known that vertices always exist in this case and that the set of vertices of any Brauer character φ forms a conjugacy class of subgroups of G. In other words, the vertex is independent of the particular pair (U, α) chosen. In this paper we extend the notion of a vertex to the lifts of φ, which are the ordinary irreducible characters of G such that $\chi^o = \varphi$. We show if G has odd order, then this more general notion of a vertex also has the property that the vertices of a lift form a single conjugacy class. We also discuss a counterexample that shows that the assumption that G has odd order is necessary.

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