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On Cartan invariants and blocks of Zassenhaus algebras.

Mathematics Subject Classification 2000: 17B50; 17B55; 17B10; 17B70

Keywords: Zassenhaus algebra, generalized restricted Lie algebra, $p$-character, height, projective indecomposable module, Cartan invariant, block

Reviewer: Jörg Feldvoss (8086)

In this paper the authors determine the Cartan invariants and the dimensions of the projective indecomposable modules of the minimal $p$-envelopes of the Zassenhaus algebras $W(1, n)$ over an algebraically closed field of characteristic $p > 2$ for $n > 1$ and all heights of the $p$-character except the highest height $p^n - 1$. If the height is $-1$ this is a special case of a result of D. K. Nakano [Mem. Am. Math. Soc. 98, No. 470, 84 p. (1992; Zbl. 0757.17015)] who determined the restricted Cartan invariants of the minimal $p$-envelopes of the generalized Jacobson-Witt algebras $W(m, n)$ and the case $n = 1$ (including the highest height) was done by J. Feldvoss and D. K. Nakano [J. Algebra 203, No. 2, 447-469 (1998; Zbl. 0913.17009)]. As a consequence of their main result the authors obtain that the minimal $p$-envelopes of the Zassenhaus algebras $W(1, n)$ have a unique block if the height is less than $p^n - 1$ which generalizes another result by Feldvoss and Nakano in the paper mentioned above. It should be noted that the paper under review is written in the language of generalized restricted Lie algebras which was introduced by its first author but is equivalent to the language of minimal $p$-envelopes as was shown by the same author [Quasi $p$-mappings and representations of modular Lie algebras, in: Representations and Quantizations, Proceedings of the International Conference on Representation Theory, Shanghai, China, June 29 - July 3, 1998 (eds. Jianpan Wang et al.), China Higher Education Press, Beijing, pp. 375-402 (2000; Zbl. 1007.17015)].