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**Representations of the Special Lie Superalgebra with  $p$ -Character of Height One**

Let  $\mathbf{k}$  be an algebraically closed field of prime characteristic and  $S(n)$  be the special Lie superalgebra of Cartan type over  $\mathbf{k}$ . Define  $\bar{S}(n) = S(n) \oplus \mathbf{k}\{-\xi_1 D_1\}$ . So  $\bar{S}(n)_0 \cong \mathfrak{gl}(n)$ . Let  $\mathfrak{g} = S(n)$  or  $\bar{S}(n)$ . We investigate in this paper the representations of  $\mathfrak{g}$  when  $\chi$  is restricted or  $\text{ht}(\chi) = 1$ . The main results are listed below.

(1) When  $\text{ht}(\chi) = 1$ , the irreducible representations of  $U_\chi(\mathfrak{g})$  are considered. Precisely, the composition factors of the Kac modules are confirmed and the dimensions of simple modules are given.

(2) When  $\chi = 0$  or  $\text{ht}(\chi) = 1$ , the structures of indecomposable projective modules are studied and the Cartan invariants of  $U_\chi(\mathfrak{g})$  are given.

(3) When  $\chi = 0$  or  $\text{ht}(\chi) = 1$ , we show that the representation category over  $U_\chi(\mathfrak{g})$  has only one block (reckoning parities in).

**Keywords:** Special Lie superalgebra, irreducible representations, projective representations, Cartan invariants, block.

**MSC:** 17B10,17B50,17B35.