Aizawa, N.; Amakawa, K.; Doi, S.
Z^n_2-graded extensions of supersymmetric quantum mechanics via Clifford algebras. (English)

The article considers generalizations of super-Poincaré algebra in one dimension. The super-Poincaré algebra is a Lie superalgebra; it is generalized to a Z^n_2-graded color Lie superalgebra. For any n the authors constructed a family of representations of Z^n_2 super-Poincaré algebra by using matrix representations of Clifford algebras. For each n the minimal (2^n-dimensional in the sense of size of matrices), maximal (2^{n+1}-dimensional) and next to the minimal (2^n-1-dimensional) representations are presented. The representations of minimal and maximal size contain different numbers of central charges. Representations with intermediate size between minimal and maximal are also mentioned; the examples for n = 4 and n = 5 are constructed explicitly. The different representations for the same n depend on the Clifford algebra used in the construction, as shown in Table 1 of the paper.

The paper also considers the degeneracy of zero energy and excited states of the Hamiltonian operators for each (minimal, maximal and next to minimal) representations.

Reviewer: Zhanna Kuznetsova (Santo André)

MSC:
81Q60 Supersymmetry and quantum mechanics
81R05 Finite-dimensional groups and algebras motivated by physics and their representations
17B75 Color Lie (super)algebras
17B81 Applications of Lie (super)algebras to physics, etc.
16S20 Centralizing and normalizing extensions
15A67 Applications of Clifford algebras to physics, etc.

Keywords:
supersymmetric quantum mechanics; color Lie superalgebras; Clifford algebras

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References:
[1] Bruce, A. J.; Duplij, S., Double-graded supersymmetric quantum mechanics


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