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Codimension Growth of Solvable Lie Superalgebras

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We consider polynomial identities of Lie superalgebras over a field F of characteristic zero. Given an algebra A over f, one can associate a sequence of non-negative integers called codimensios of A. In many cases, in particular, if $\dim A$ is finite, codimension sequence is exponentially bounded. Ratio of exponent, if exists, is called PI-exponent of A. We denote it as $\exp(A)$.

Now let L be a finite dimensional Lie superalgebra over F. If L is an ordinary Lie algebra, then $\exp(L)$ always exists and is a non-negative integer [1]. For an arbitrary Lie superalgebra existence of $\exp(L)$ is an open problem. Nevertheless if commutator subalgebra of L is nilpotent then $\exp(L)$ exists and is an integer [2]. On the other hand, there are examples of finite dimensional Lie superalgebras with fractional PI-exponent [3]. It is known that solvability of finite dimensional Lie superalgebra L does not imply nilpotency of commutator subalgebra of L. The following conjecture looks naturally: is it true that $\exp(L)$ exists and is an integer for any finite dimensional solvable Lie superalgebra L? First such example was constructed in [4]. Here we present more examples and define new series of solvable Lie superalgebras L with non-nilpotent L' and with expectable integrality of $\exp(L)$.

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References

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