Review: Lie Structure in Semiprime Superalgebras with Superinvolution

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Lie structure in semiprime superalgebras with superinvolution. (English summary)


The Lie structure in the set of all skew elements of a given associative algebra has been studied since the 1958 article of W. E. Baxter [Trans. Amer. Math. Soc. 87 (1958), 63–75; MR0095866 (20 #2364)]; also see [I. N. Herstein, J. Algebra 14 (1970), 561–571; MR0255610 (41 #270)]. A natural extension of these results to the graded case of a superalgebra has been initiated by C. Gómez-Ambrosi and I. P. Shestakov [J. Algebra 208 (1998), no. 1, 43–71; MR1643975 (99j:17032)] and Gómez-Ambrosi, Laliena Clemente and Shestakov [Comm. Algebra 28 (2000), no. 7, 3277–3291; MR1765316 (2001g:17007)]. The paper under review further extends these results.

Let $A$ be a semiprime associative superalgebra with superinvolution, over a commutative unital ring where 2 is invertible. Let $K$ be the set of all skew elements of $A$ with respect to this superinvolution. The main result of the paper under review is a description of the ideals of $K$.

In particular, if $U$ is any Lie ideal of $K$, then either there is an ideal $J$ of $A$ such that the Lie ideal $[J \cap K, K]$ is nontrivial and lies completely in $U$, or the superalgebra $A$ can be written as the subdirect sum of $A'$ and $A''$ such that the image of $U$ in $A'$ is central, and the second component $A''$ is a subdirect product of orders in simple superalgebras, each of which is at most 16-dimensional over its center.

The significant contributions of this particular paper to its predecessors cited above are: the change of the (super)algebra base from a field of characteristic not equal to 2 to a general commutative unital ring with an inverse for 2; and the extension of the results to a semiprime superalgebra in place of a prime superalgebra. The paper is well written and easy to follow.

Reviewed by Gizem Karaali

References

5. I.N. Herstein, Topics in Ring Theory, University of Chicago Press, Chicago, 1969. MR0271135 (42 #6018)

Note: This list reflects references listed in the original paper as accurately as possible with no attempt to correct errors.

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