The algebra of 2×2 upper triangular matrices as a Lie algebra: gradings, graded polynomial identities and Specht property.

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In this work, we present some recent results in PI-theory about gradings and graded polynomial identities for the algebra of upper triangular matrices of order 2 when it is defined as a Lie algebra. More precisely, fixed a field K of characteristic 2 (finite or infinite), we present a classification of the gradings on $(UT_2(K), \circ)$, the algebra of upper triangular matrices of order 2 over K endowed with the product defined by $x \circ y = xy + yx = xy - yx$. We also determine generators for the T_G-ideals of these gradings as well give a positive answer to the Specht problem for the variety of Lie algebras generated by $UT_2(K)$ for each of these gradings.