On the finite basis problem for varieties generated by upper triangular matrices

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In this seminar, we talk about the Specht problem for varieties of graded algebras generated by $UT_n^{(-)}$, the Lie algebra of upper triangular matrices of size $n \times n$ over an infinite field $\mathbb{K}$. Specifically, we give a positive answer to the finite basis problem for the variety of graded Lie algebra generated by $UT_n^{(-)}$ with the canonical grading, when the characteristic p of K is either zero or greater than $n-1$. Furthermore, if $\mathbb{K}$ is a field of positive characteristic p, we construct three varieties of $\mathbb{Z}_{p+1}$-graded Lie algebras that do not have a finite basis of graded identities and satisfy the same graded identities that, in the case of an infinite field, define the variety generated by $UT_{p+1}^{(-)}$. Finally, we discuss the analogous problem for the variety generated by $UT_3^{(-)}$, endowed with an elementary grading.