SEMINARIO DI GEOMETRIA E ALGEBRA

UNIBA - POLIBA

Mercoledì 14 Maggio 2025 - Ore 15:00 - Dip. di Matematica, aula IX

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Group gradings on solvable Lie algebras

Abstract. Let $UT_n^{(-)}$ be the Lie algebra of the $n \times n$ upper triangular matrices over a field. The description of the group gradings on this álgebra is an important problem. When considering the associative algebra UT_n, it was shown by Valenti and Zaicev that every grading is isomorphic to elementar one (in other words all matrices e_{ij} are homogeneous in the grading). The elementary gradings on UT_n were described some 20 years ago by Di Vincenzo, PK, Valenti. Surprisingly (or not so) in the case of Lie algebras there appear gradings that are not isomorphic to elementary ones. We classify all group gradings on $UT_n^{(-)}$. Similar methods and results hold for the Jordan algebra $UT_n^{(+)}$. We also draw conclusions concerning the graded polynomial identities these gradings satisfy. This is a joint work with F. Yukihide, parts of it published around 2018, and also recently, in 2023, in streamlined and more general form.

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