

Monomial identities and almost non-degenerate gradings on matrix algebras

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Abstract. Let G be a group. A G -grading on the matrix algebra $R = M_n(F)$ is called elementary, if each matrix unit e_{ij} is homogeneous in this grading. There are many results in the literature concerning the graded identities of R . In particular, if the neutral component is the set of diagonal matrices, then the graded identities of R follow from three basic types of identities and monomial identities of length ≥ 2 bounded by a function $f(n)$.

In this talk we will present a recent and complete result about the optimality of the bound function $f(n)$.

When G is a linearly ordered abelian group, we will show necessary conditions so that a G -grading on R is almost non-degenerate, i.e., a grading in which the monomial identities are consequences of monomial identities of length one.

For the case $G = \mathbb{Z}$, and $n \leq 5$, we give a complete characterization of all almost non-degenerate gradings on R .

These results were obtained in a joint work with Diogo Diniz and Lucio Centrone.