Primeness property for graded central polynomials of verbally prime algebras

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Abstract. Let F be an infinite field. The primeness property for central polynomials of $M_n(F)$ was established by A. Regev, i.e., if the product of two polynomials in distinct variables is central, then each factor is also central. In this work we consider the analogous properties for $M_n(F)$ and determine, within the elementary gradings with commutative neutral component, the ones that satisfy this property, namely the crossed product gradings. Next, we consider $M_n(R)$, where R admits a regular grading, with a grading such that $M_n(F)$ is a homogeneous subalgebra and provide sufficient conditions - satisfied by $M_n(E)$ with the trivial grading - to prove that $M_n(R)$ has the primeness property if $M_n(F)$ does. We also prove that the algebras $M_{a,b}(E)$ satisfy this property for ordinary central polynomials. Hence we conclude that, over a field of characteristic zero, every verbally prime algebra has the primeness property. This is a joint work with Diogo Diniz.