

Absolutely Koszul algebras

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The linearity defect of a finitely generated graded module over a standard graded algebra is the point after which the linear part of its minimal graded free resolution has only trivial homology. Following Herzog and Iyengar the module is said to be Koszul if its linearity defect is zero. This is motivated by the fact that the algebra is Koszul in the classical sense if and only if the base field is a Koszul module. We call the algebra absolutely Koszul if every finitely generated graded module has finite linearity defect. Trivially absolutely Koszul algebras are Koszul, but the converse is false. Observe that the advantage of this approach is that these definitions and many of the associated methods also work in the case of local rings. Unlike the case of Koszul algebras not too much is known about absolutely Koszul rings. We present recent results and discuss some open problems on this class of rings. This is joint work with Aldo Conca, Srikanth Iyengar and Dang Hop Nguyen.