

1059-13-235

Kristen A Beck* (kbeck@uta.edu), Box 19408, Arlington, TX 76013. *On the Hilbert series of a local ring with $\mathfrak{m}^4 = 0$ which admits non-trivial totally reflexive modules.* Preliminary report.

A finitely generated module M over a ring R is called *totally reflexive* if and only if the following conditions hold:

1. $\text{Ext}_R^i(M, R) = 0$ for all $i > 0$
2. $\text{Ext}_R^i(M^*, R) = 0$ for all $i > 0$
3. $M \cong M^{**}$ via the canonical biduality map

Such modules are a natural generalization of projective modules, and they form the building blocks of Gorenstein dimension. Furthermore, their non-trivial existence is essential to the computation of Tate (co)homology.

In this talk we will characterize the Hilbert series of a local ring (R, \mathfrak{m}) , with $\mathfrak{m}^4 = 0$, which admits a totally reflexive module with linear complete resolution. We will consider several examples of such rings, and will finish with some open questions. (Received February 23, 2010)