

ON THE BEHAVIOR OF DEPTH AND DIMENSION OF HIGH SYZYGY MODULES

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ABSTRACT. In this talk, we will investigate the asymptotic behavior of two invariants, depth and dimension, for syzygies of a finitely generated module of infinite projective dimension over a commutative local Noetherian ring. It is already known, by work of Okiyama (1991), that the depths of such syzygies eventually stabilize to that of the ring. This result is natural, given the intimate connection between depth and free resolutions. However, formulating a similar statement for dimension is not as straightforward.

The ultimate goal of this talk is to give necessary conditions for the stabilization of dimensions of syzygy modules. In particular, we will show that all high syzygies of a module with eventually non-decreasing Betti numbers over an equidimensional ring have dimension equal to the dimension of the ring.

This talk is based on joint work with Micah Leamer, which commenced at the 2010 AMS Mathematics Research Community in Snowbird, UT.