

Classifying Gorenstein quotients of e.g. codimension 4 in a polynomial ring

J.O. Kleppe

Let $\text{GradAlg}^H(R)$ be the scheme parametrizing graded quotients of a polynomial ring R with Hilbert function H . We prove there is a close relationship between the irreducible components of $\text{GradAlg}^H(R)$ whose general member is a Gorenstein codimension $(c + 1)$ quotient, and the irreducible components of $\text{GradAlg}^{H'}(R)$ whose general member B is a codimension c Cohen-Macaulay algebra of Hilbert function H' related to H . If the Castelnuovo-Mumford regularity of the Gorenstein quotient is large compared to the Castelnuovo-Mumford regularity of B , this relationship actually determines a well defined injective mapping from such “Cohen-Macaulay” components of $\text{GradAlg}^{H'}(R)$ to “Gorenstein” components of $\text{GradAlg}^H(R)$, in which generically smooth components correspond. Moreover the dimension of the “Gorenstein” components is computed in terms of the dimension of the corresponding “Cohen-Macaulay” component and a sum of two invariants of B which one may compute using linkage by a complete intersection. Finally we consider several generalizations of these results.