

HILBERT COEFFICIENTS OF GRADED COHEN-MACAULAY ALGEBRAS

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Let R be a polynomial ring in n variables over a field k and I a homogeneous ideal in R . Let:

$$\mathbb{F} : 0 \rightarrow \bigoplus_{j=1}^{b_s} R(-d_{sj}) \xrightarrow{\delta_s} \cdots \rightarrow \bigoplus_{j=1}^{b_i} R(-d_{ij}) \xrightarrow{\delta_i} \cdots \rightarrow \bigoplus_{j=1}^{b_1} R(-d_{1j}) \xrightarrow{\delta_1} R$$

be a minimal graded free resolution of $S = R/I$.

Suppose that S is Cohen-Macaulay. We give an explicit formula for the Hilbert coefficients of S as a function of the determinants of Vandermonde matrices whose entries are the shifts $d'_{ij}s$ in \mathbb{F} .