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Universal Annihilators

This is a report on joint work with H.Flenner (Bochum). Let R be a complete local noetherian ring of dimension d. What is the universal annihilator of $Ext_R^{d+1}(M,N)$ for finitely generated R–modules M,N?

If $d=1$ and R is reduced, a result of Wang (1994) identifies this annihilator as the conductor ideal. For R Gorenstein of arbitrary dimension and containing a coefficient field K, we show that this annihilator contains the annihilator of the cokernel of a natural map from the d^{th} Hochschild homology of R to the ring, which in turn in the reduced case contains the annihilator of the cokernel of the characteristic class, the natural linear map from the module of top differential forms $\Omega^d_{R/K}$ to the dualizing module $\omega_{R/K}$. This annihilator contains any Noether different and so also the Jacobian ideal, thereby strengthening earlier results.

These results provide in particular a lower bound for the universal annihilator of the stable category of maximal Cohen-Macaulay modules over such a ring, a quantity of interest in string theory.