Noncommutative Resolutions of Discriminants of Reflection Groups

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Abstract

This is joint work with R-O. Buchweitz and E. Faber. Let $W$ be subgroup of $GL(V)$ generated by reflections. Let $S = k[V]$ be the polynomial ring and let $z \in S$ cut out the hyperplane arrangement of mirrors in $V$. The discriminant is the image of the hyperplane arrangement in the quotient $V/W$ which is cut out by $z^2$. Let $A$ be the skew group algebra $W \rtimes k[V]$. Let $e$ be the idempotent of $kG$ corresponding to the trivial representation. Our main result is that $\text{End}_{S^W}(S/zS) = A/AeA$ forms a noncommutative resolution of the discriminant since it is Koszul, has global dimension $\dim V - 1$, and its centre $S^W/(z^2)$ is polynomial functions on the discriminant.