Is a face ring equivariantly isomorphic to its barycentric subdivision, as modules over the parameter subring?

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Abstract

In this talk, I consider the relationship between the Stanley-Reisner ring (a.k.a. face ring) of a simplicial or boolean complex Δ and that of its barycentric subdivision. These rings share a distinguished parameter subring. S. Murai asked if they are isomorphic, equivariantly with respect to the automorphism group $\mathrm{Aut}(\Delta)$, as modules over this parameter subring. I will show that, in general, the answer is no, but that for Cohen-Macaulay complexes in characteristic coprime to $|\mathrm{Aut}(\Delta)|$, it is yes, and an isomorphism can be constructed explicitly. This is joint work with Sophie Marques.

Keywords: Stanley-Reisner ring, simplicial complex.