

Lefschetz properties and coinvariant stresses

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The Hard Lefschetz theorem has played pivotal roles in recent breakthroughs in combinatorics. Two specific settings where this theorem has been applied to great success are invariant theory and the study of h-vectors of simplicial polytopes. In this talk we mix these two settings by viewing symmetric functions as a system of parameters for face rings. We compute Macaulay dual generators of face rings mod this system of parameters in terms of simplicial homology and apply this result to find large families of artinian level monomial algebras failing the weak Lefschetz property (WLP). As a special case, we recover a result by Migliore, Miró-Roig and Nagel on the failure of the WLP of monomial almost complete intersections.

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