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Hilbert Functions of Graded Gorenstein Ideals with an S_n -action.

We are interested in describing all possible Hilbert Functions of graded artinian Gorenstein quotients of the polynomial ring which are also representations of the symmetric group. Bergeron, Garsia and Tesler gave an explicit description of the graded characters of all such algebras whose socle is spanned by an alternating function. This leaves only the case where the socle is spanned by a symmetric function. We will determine the graded characters and Hilbert functions for these quotients for a large class of symmetric functions. We do this by relating these algebras to subrepresentations of the regular representation of the symmetric group. These graded characters turn out to be closely related to Kostka-Foulkes polynomials.

This is joint work with A. Geramita(Queen's University) and A. Hoefel(Google).