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Tom Halverson* (halverson@macalester.edu), Macalester College, Saint Paul, MN 55105.

Schur-Weyl Duality for Complex Reflection Groups. Preliminary report.

For a complex reflection group G defined on a n-dimensional $\mathbb{C}$-vector space V we consider the space $\mathsf{End}_G(V^{\otimes k}) = \mathsf{Hom}_G(V^{\otimes k}, V^{\otimes k})$ of endomorphisms that commute with G on the k-fold tensor product $V^{\otimes k}$. The algebra $\mathsf{End}_G(V^{\otimes k})$ is a semisimple matrix algebra that is in "Schur-Weyl duality" with G. When G is the symmetric group S_n, and V is its permutation representation, $\mathsf{End}_G(V^{\otimes k})$ is the partition algebra with a basis labeled by the set partitions of $\{1, \ldots, 2k\}$. We examine the extension of this idea to other complex reflection groups. For example, when $G = G(r, p, n)$, in Shepard-Todd notation, $\mathsf{End}_G(V^{\otimes k})$ is the Tanabe partition algebra $A_k(r, p, n)$. If $\dim(V) = 2$ and G is a finite subgroup of $\mathsf{SU}(2)$, then $\mathsf{End}_G(V^{\otimes k})$ can be studied, via the McKay correspondence, using the combinatorics of the affine (extended) Dynkin diagrams of type ADE. (Received June 29, 2011)