Diagonal coinvariants for Weyl groups

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Abstract. The *coinvariant ring* for a finite group G acting on a vector space V is the quotient of the polynomial ring $k[V]$ by the ideal generaated by G-invariant polynomials without constant term. Recently I proved that for the "diagonal" action of the symmetric group S_n on two copies $H \oplus H$ of its natural representation H, the coinvariant ring has dimension $(n+1)^{(n-1)}$. Earlier I had conjectured that the corresponding number for a Weyl group W acting diagonally should be $(h+1)^r$, where h is the Coxeter number and r is the rank—provided that in general the space with this dimension is not the coinvariant ring itself, but some naturally occuring proper quotient of it. Iain Gordon has proved my conjecture using representation theory of Cherednik algebras. I will explain the background material and Gordon's result.