A Descent Basis for the Garsia-Procesi Module

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Abstract

The Garsia-Procesi module R_λ has a well known basis of Artin monomials indexed by λ-sub-Yamanouchi words, which correspond to the inv-statistic of the Haglund-Haiman-Loehr combinatorial formula for the modified Macdonald polynomials $\widetilde{H}_\lambda(x; q, t)$ at $t = 0$. We introduce a new basis for R_λ of Garsia-Stanton descent monomials, giving a major-index type formula of the modified Hall-Littlewood polynomial $\widetilde{H}_\lambda(x; q, t)$, and discuss the subtle connection to $\widetilde{H}_\lambda(x; q, t)$ at $q = 0$ via Robinson-Schensted-Knuth insertion. Our formula was discovered while searching for a basis of the Garsia-Haiman module by extending a similar result of Carlsson and Oblomkov for the diagonal coinvariants DH_n. This is joint work with E. Carlsson.