Workshop on Combinatorial Hopf Algebras
and Macdonald Polynomials
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The combinatorics of Macdonald's D_n^1 operator

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Abstract

To prove the existence of the Macdonald polynomials $\{P_\lambda(x;q,t)\}_{\lambda\vdash n}$, Macdonald introduced an operator D_n^1 and proved that for any Schur function $s_\lambda(x_1,\ldots,x_n)$, $D_n^1\big(s_\lambda(x_1,\ldots,x_n)\big) = \sum_\mu d_{\lambda,\mu}(q,t)s_\mu(x_1,\ldots,x_n)$ where the sum runs over all partitions μ of n which are less than or equal to λ in the dominance order and the $d_{\lambda,\mu}(q,t)$ are polynomials in q and t with integer coefficients. We give an explicit combinatorial formula for the $d_{\lambda,\mu}(q,t)$'s.