

Workshop on Combinatorial Hopf Algebras
and Macdonald Polynomials

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Dual equivalence graphs, ribbon tableaux and Macdonald polynomials

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Abstract

We introduce a new combinatorial construction, called a dual equivalence graph, based on the dual equivalence relation on tableaux. We define a generating function on the vertices of these graphs and show that it is always Schur positive. We outline the construction of a graph on standard k -tuples of young tableaux which we prove is a dual equivalence graph for $k \leq 3$. This gives a combinatorial description of the Schur coefficients of the ribbon tableaux generating functions introduced by Lascoux, Leclerc and Thibon. Using Haglund's monomial expansion for Macdonald polynomials, we conclude with a combinatorial formula for the Schur expansion of Macdonald polynomials indexed by a partition with at most 3 columns.