

A probabilistic interpretation of the Macdonald polynomials

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Abstract. The two-parameter Macdonald polynomials are a central object of study in algebraic combinatorics. Arun Ram and I have found a simple Markov chain on partitions (with stationary distribution the Macdonald weight) whose eigenfunctions are the coefficients of the Macdonald polynomials when expanded in the power sums. In turn, this Markov chain is a special case of classical algorithms in statistical mechanics (Swendsen-Wang and auxiliary variable algorithms). The wealth of knowledge about Macdonald polynomials allows a sharp analysis of the rate of convergence of the Markov chain to stationarity.