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AWM Colloquium

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Staircase tableaux and the asymmetric exclusion process

Abstract:

The ASEP is a model from statistical mechanics which describes a system of interacting particles hopping left and right on a one-dimensional lattice of n sites with open boundaries. In the bulk, the rate of hopping left is q times the rate of hopping right, and particles may enter and exit at both sides of the lattice at rates α , β , γ , and δ . We introduce some new tableaux (staircase tableaux) and use them to describe the stationary distribution of the ASEP with all parameters general. These tableaux seem to have very interesting combinatorial properties. For example, the staircase tableaux of size n have cardinality $4^n n!$, and distinguished subsets of them have cardinality $(2n-1)!!$, $(n+1)!$, and C_n (Catalan numbers). I'll close with applications to Askey-Wilson polynomials, and several open problems. This is joint work with Sylvie Corteel (and part of it is additionally joint with Dennis Stanton).

Host: Association for Women in Mathematics (AWM)

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