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Type C multiline queues and the open-boundary TASEP

The totally asymmetric simple exclusion process (TASEP) is a finite Markov chain of particles hopping between adjacent sites on a one-dimensional lattice. The multispecies TASEP is a generalization in which particles have different types. These processes have interesting connections to algebraic combinatorics: the stationary distribution of the TASEP on a circle is connected to Macdonald polynomials at t=0, whereas the stationary distribution of the open-boundary TASEP is connected to Koornwinder polynomials at t=0. Multiline queues were introduced by Ferrari and Martin (2007) to compute the stationary distribution of the multispecies TASEP on a circle. It has been a long-standing open problem to find a combinatorial formula for the stationary distribution of the multispecies TASEP with open boundaries. Recently, we studied the combinatorics of Ferrari—Martin multiline queues using type A crystals. In this talk, we use crystals of type C to construct an analog of multiline queues and give a combinatorial formula for the stationary distribution of the multispecies open-boundary TASEP for a certain specialization of the boundary parameters. This is joint work with Olya Mandelshtam.