

Discrete Mathematics & Combinatorics

An interesting Markov chain on cyclic permutations

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Assume we have n particles labeled $\{1, 2, \dots, n\}$ on a cycle. A particle i can jump to the left if the particle to the left is labelled j , where $j > i$. A jump means that i and j switch places. If we let particles try to jump randomly we get a Markov chain which is an example of a TASEP (Totally asymmetric simple exclusion process). TASEPs (and other exclusion processes) on a line have been studied intensively in combinatorics in recent years.

The TASEP on a cycle has been studied both for probabilistic and algebraic combinatorics reasons. It exhibits a number of very nice structural and enumerative properties. An essential tool are so called multi-line queues defined by Ferrari and Martin.