Abstract

Interacting particle system and KPZ-scaling

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First of all the simple exclusion process will be defined and for a special case of it, for the asymmetric simple exclusion process (ASEP), we compute the stationary distribution of the configurations of particles on the lattice. After defining particle current and density we write down the evolution equation, we solve it for the ASEP and we illustrate how to create a surface growth model from one dimensional processes. The main part of my thesis is to understand Johansson's theorem, which relates the particle flux fluctuation of the discrete totally asymmetric simple exclusion process (dTASEP) to the Tracy-Widom distribution of random matrix theory. Finally, we prove a related statement about the convergence of the Hermite polynomials to the Airy function with the steepest decent method.