Height Distributions in One-Dimensional Surface Growth: from ASEP to KPZ Equation

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The Kardar-Parisi-Zhang equation is a nonlinear stochastic partial differential equation, describing surface growth phenomena. This has been well-known for a long time but explicit height distributions have been obtained only very recently.

The results have been obtained by combining a plausible regularization procedure by Bertini, Giacomin using the Cole-Hopf transformation some time ago, and a recent contour integration formula for thedistribution of a particle position in ASEP by Tracy and Widom.

In this presentation we explain the derivation of the solution from the results for the ASEP and some consequences and implications. We will also discuss a duality relation for ASEP to study the integrated current.