Analytic Combinatorics and the Airy distribution

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Abstract

In this talk, I will present old and new results on the Airy function in combinatorics. After a brief sketch of its role in physics, I will explain how it appears in probability theory, for area below Brownian motion, for random matrices, and then why it appears in combinatorics via analytic methods.

This applies to numerous models from combinatorics or statistical mechanics: polyominoes and self-avoiding walks, lattice paths, internal path length for trees, connectivity for random maps, transition phase for random graphs, unranking algorithms costs or linear probing hashing in analysis of algorithms...

I will end with new models (permutations, partitions) leading to functional equations involving the Airy distribution.