

Christopher Sinclair
University of Oregon, USA

Mahler measure, random polynomials and 2D electrostatics

The Mahler measure of an integer polynomial is a measure of complexity which includes archimedean information (via the location of roots in the complex plane) and non-archimedean information (from the absolute value of the leading coefficient). A degree N complex/real polynomial chosen uniformly from the set of polynomials with Mahler measure bounded by a constant forms a determinantal/Pfaffian point process in the complex plane, and introduces new universality classes (i.e. kernels and their scaling limits) into the panoply of kernels arising from random matrix theory. These ensembles of random polynomials can also be interpreted in terms of 2-dimensional electrostatics, and generalize the classical (Hermitian and Ginibre) ensembles in RMT by replacing the polynomial potentials of the latter with logarithmic potentials attached to compact subsets of the complex plane. New phenomena arise, and we will talk about several new kernels and universality classes (some proved, and some conjectural). Joint work with Maxim Yattselev (IUPUI).