Boğaziçi
MATH COLLOQUIUM

On the Limiting Shape of Young Diagrams Associated With Markov Random Words

Christian Houdre
Georgia Institute of Technology

Abstract: Motivated by a conjecture on the asymptotic behavior of the length of the longest increasing subsequences of Markov random words, over a totally ordered finite alphabet of fixed size, using combinatorial constructions and weak invariance principles, we obtain the limiting shape of the associated RSK Young diagrams as a multidimensional Brownian functional. Since the length of the top row of the Young diagrams is also the length of the longest (weakly) increasing subsequence of the word, the corresponding limiting law follows. Under a cyclic condition, a spectral characterization of the Markov transition matrix precisely characterizes when the limiting shape is the spectrum of the $m \times m$ traceless GUE and so is akin to the iid framework. For each $m \geq 4$, this characterization identifies a proper, non-trivial class of cyclic transition matrices producing such a limiting shape. However, for $m = 3$, all cyclic Markov chains have such a limiting shape, a fact previously only known for $m = 2$. For m arbitrary, we also study reversible Markov chains and obtain a characterization of symmetric Markov chains for which the limiting shape is the spectrum of the traceless GUE.

This is joint work with Trevis Litherland.

Date : Wednesday, October 10, 2018
Time: 13:30
Place: TB 130, Boğaziçi University