Symmetric functionals on random matrices and matchings in bipartite random graphs

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Abstract

Consider a rectangular matrix of iid elements. The talk shall be concered with the asymptotic behavior (an m,n increase) of certain class of the row-column symmetric functionals of iid matrices which were called by Cauchy in his famous memoir on determinants "permanently symmetric". It turns out that the class of such functions includes some well know sub-classes of symmetric functions like e.g., U-statistics.

Due to the duality between radon matrices and bipartite random graphs, the problem may be also described in terms of the functionals on the matchings of the corresponding random graphs. Such an interpretation is of interest since many of the countign problems involving matchings are known to be #P hard.

The talk shell present some results on the asymptotic behavior and offer various examples of applications starting from the classical Dynkin-Mandelbaum result on the limits of U-statistic until a more recent theorems on distribution of monochromatic matchings in bipartite graphs.