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Graphs and Random Matrices

For the last twenty years free probability has been used to model the large N limit of independent random matrices. Recently Roland Speicher and I have developed the theory of second order freeness to analyse the fluctuations of these random variables around their limiting distributions.

As was found by Voiculescu in the case of first order freeness in 1991, many standard ensembles of random matrices used in physics and statistics exhibit second order freeness. I will explain how an analysis of some graphs can be used to analyse the fluctuations of Wigner ensembles. This is joint work with Roland Speicher.