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Michael Cap Khoury* (mjkhoury@umich.edu) and **Steven J Miller**. *On the Limiting Distribution of Eigenvalues of Large Random d -Regular Graphs with Weighted Edges.*

Random matrix ensembles model many phenomena, from nuclear energy levels to L-function zeros. The idea is to generate $N \times N$ matrices from some nice distribution and look at their spectra. For large N , the behavior of the eigenvalues of a typical matrix is close to the ensemble average. McKay determined the limiting spectral measure for adjacency matrices of d -regular graphs. While the family of real symmetric matrices has the semi-circle as its limiting spectral measure, new distributions govern the behavior for finite d .

Here we consider weighted d -regular graphs, where each non-zero entry of the adjacency matrix is weighted by a random variable. While numerical simulations and a computation of the first 6 moments supported the conjecture that the weighted ensemble would have the semi-circle as its limiting measure iff the weights were drawn from a semi-circle, we show this is not true. If c_{2k} is the $2k$ -th moment of the semi-circle, then the $2k$ -th moment of this ensemble is $c_{2k} + O(1/d^2)$. The proofs involve a combinatorial analysis of acyclic paths on trees. (Received September 09, 2011)