1077-VJ-601 **Karen Shen*** (shenk@stanford.edu), PO Box 12502, Stanford, CA 94309, and **Olivia Beckwith** and **Steven J Miller**. *Distribution of Eigenvalues of Weighted, Structured Matrix Ensembles.*

The study of the distribution of eigenvalues of large random matrices has many applications (nuclear physics, number theory). Previous work has determined the limiting spectral measures for many matrix ensembles, famously the semicircle for the real symmetric matrices, but also more structured ensembles such as the Toeplitz and circulant matrices. We introduce a parameter p to continuously interpolate between such structured ensembles and the real symmetric ensemble by multiplying each entry by $\epsilon_{ij} = \epsilon_{ji} = \pm 1$ where $p = \mathbb{P}(\epsilon_{ij} = 1)$. For $p = 1/2$, we prove the limiting measure is the semicircle. For all other p, we prove the measure has unbounded support. The proofs are by Markov's Method of Moments where the moment analysis involves analyzing pairings of vertices on a circle. We prove that the contribution of each pairing is weighted by a factor depending on p and m, the number of vertices in crossing pairs. The number of pairings with no crossings ($m = 0$) is well-known as the Catalan numbers; we discover and prove similar formulas for $m = 4, 6, 8$ and 10 and find closed-form expressions for the expected value and variance. As the variance converges to 4, these results yield significant information about the limiting measure. (Received September 08, 2011)