**Random Matrix Theory**

Going to summarize the random matrix theory method real fast. The advantage of this approach is that it’s kind of a non-perturbative method, like the variational approach. We start with the transmission matrix T = tt†. First it is Hermitiain obviously. In the β = 1,2,4 cases, its eigenvectors will be orthogonal, unitary, and symplectic. Anyway, it follows that any probability distribution of these matrices can be written as:



where the correlation term is their measure. Major assumption was that F may be written as a single particle function, and that correlations were only present through the Jacobian here. The probability distribution could be written in functional form as:



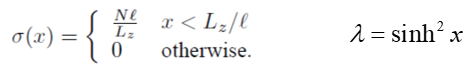
and then averages could be taken via:



In particular we can solve for the expected eigenvalue density – we’d have to Gaussianize about the saddle point, and then the average would effectively be the saddle point, and so we’d have:



But instead of using this equation to determine <σ(λ)>, we presume the an a priori known phenomenological model, like below in the metallic regime:



and use the eigenvalue equation to determine F(λ). The fixes P[σ(λ)] and from here transport calculations can be made. But the distribution, though close, is not quite right. It predicts <g>2 = 1/8β in Q1D regime, rather than 2/15β. Furthermore, solution of DMPK, showed there are indeed two particle correlations in F. Apparently RMT is fairly exact for closed systems, but not open ones?