Forrester, P. J.; Keating, J. P.
Singularity dominated strong fluctuations for some random matrix averages. (English)

Summary: The circular and Jacobi ensembles of random matrices have their eigenvalue support on the unit circle of the complex plane and the interval (0, 1) of the real line respectively. The averaged value of the modulus of the corresponding characteristic polynomial raised to the power $2\mu$ diverges, for $2\mu \leq -1$, at points approaching the eigenvalue support. Using the theory of generalized hypergeometric functions based on Jack polynomials, the functional form of the leading asymptotic behaviour is established rigorously. In the circular ensemble case this confirms a conjecture of M. V. Berry and J. P. Keating [J. Phys. A, Math. Gen. 35, No. 1, L1–L6 (2002; Zbl 1012.81015)].

MSC:
82B44 Disordered systems (random Ising models, random Schrödinger operators, etc.) in equilibrium statistical mechanics
11M26 Nonreal zeros of $\zeta(s)$ and $L(s, \chi)$; Riemann and other hypotheses
15B52 Random matrices (algebraic aspects)
60F05 Central limit and other weak theorems
33C70 Other hypergeometric functions and integrals in several variables

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References:


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