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Moments of derivatives of L-Functions

An important problem in analytic number theory is to understand the asymptotic behavior of mean values of L-functions. Keating and Snaith conjectured that these asymptotics can be predicted by computing mean values of characteristic polynomials of random matrices. In the same way one can also give conjectures for averages of derivatives of L-functions, but the process becomes computationally very expensive and we can compute the leading coefficients of only the first few moments. In the case of unitary families, Conrey, Rubinstein and Snaith showed that these coefficients can be expressed as the determinant of a matrix of I-Bessel functions, which allows a much faster computation. In this talk we extend their work to the case of symplectic families, expressing the coefficients as the determinant of certain hypergeometric functions. We also give a recursion formula for this determinant which speed up further the computations.

This work is joint with Ali Altug, Ian Petrow, Rishikesh and Ian Whitehead.