



Matrix model for Riemann zeta via its local factors

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Abstract

We propose the construction of an ensemble of unitary random matrices (UMM) for the Riemann zeta function. Our approach to this problem is ‘*p*-iecemeal’, in the sense that we consider each factor in the Euler product representation of the zeta function to first construct a UMM for each prime *p*. We are able to use its phase space description to write the partition function as the trace of an operator that acts on a subspace of square-integrable functions on the *p*-adic field. This suggests a Berry-Keating type Hamiltonian. We combine the data from all primes to propose a Hamiltonian and a matrix model for the Riemann zeta function.

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