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On the vertical distribution of the zeros of the Riemann zeta-function

In 1973, assuming the Riemann hypothesis (RH), Montgomery studied the vertical distribution of zeta zeros, and conjectured that they behave like the eigenvalues of some random matrices. We will discuss some models for zeta zeros – starting from the random matrix model but going beyond it – and related questions, conjectures and results on statistical information on the zeros. In particular, assuming RH and a conjecture of Chan for how often gaps between zeros can be close to a fixed non-zero value, we will discuss our proof of a conjecture of Berry (1988) for the number variance of zeta zeros, in a regime where random matrix models alone do not accurately predict the actual behavior (based on joint work with Meghann Moriah Lugar and Micah B. Milinovich).