

Number Theory Seminar

Friday, September 27th, 2019

11:30 am in Hume 321

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The distribution of the zeros of the Riemann zeta-function

ABSTRACT

It has long been known that the distribution of the prime numbers is intimately connected to the distribution of the zeros of the Riemann zeta-function. Much information can be obtained from the horizontal distribution of zeros, but finer information about primes seems to be connected to the vertical distribution of zeros. By studying the pair correlation of the normalized spacing between the zeros, Montgomery was led to the conjecture that the statistics of vertical spacings should follow the GUE distribution from random matrix theory. I will survey some of the methods used to prove the existence of large and small gaps between zeros of the zeta function, highlighting the state-of-the-art and the limitations. I will also discuss some ongoing joint work (with Hung Bui and Dan Goldston) where we prove the existence of small gaps between distinct zeros of the zeta function, a result that previous methods seem incapable of establishing.