Number Theory Seminar

Summation formulas in analytic number theory

By

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Abstract:

Let $\pi(x)$ be the number of primes up to x. If you want to count primes then you can write the count as an integral in the complex plane

$$\pi(x) = \int_{2-i\infty}^{2+i\infty} \frac{\mathcal{P}(s)x^s ds}{s} \qquad \mathcal{P}(s) := \sum_p \frac{1}{p^s}.$$

Analysing the complex analytic properties on the RHS then lets you say something about the arithmetic problem on the LHS - this is the classical proof of the Prime Number Theorem.

This seminar is the second of 5-6 seminars in this mini seminar series. Last week we showed how the above is an example of Mellin inversion and this week we'll prove the above formula, apply it in the case of the divisor function, and show how it leads to *Voronoi's summation formula*. This talk will be more involved than the more "overview" style of the last talk, to which we'll return next week.

Date: Friday, Feb 28, 2025
Time: 19:00
Place: SB-Z11