NUMBER THEORY SESSION (THU 8/1/26)

ROOM C4 (14-15.50)

Tony Haddad (University of Turku)
***Poisson-Dirichlet approximation for prime factorizations* (14-14.20)**

Using the coupling method, I will present a general strategy to reduce the problem of finding an asymptotic formula for the number of integers whose prime factorization falls into any Borel set of $\ell^1(\mathbb{R})$, to finding upper bounds for two key probabilities measuring proximity to the boundary of the subset in question. We apply this strategy to give an asymptotic formula for counting integers in $[1, x]$ that have a divisor in an interval (y, z) with $z/y \to \infty$ as $x \to \infty$.

Mikko Jaskari (University of Turku)
***Bounding the error in the prime number theorem* (14.30-14.50)**

We investigate how to obtain explicit bounds for the prime number theorem by studying the distribution of zeros in the critical strip of the Riemann zeta function or L-functions in general.

Neea Palojärvi (University of New South Wales)
***On the Error Term of the Fourth Moment of the Riemann Zeta-function* (15-15.20)**

The k-th moment of the Riemann zeta function on the half-line is defined as $\int_0^T |\zeta(1/2+it)|^k dt$. It describes the average size of the Riemann zeta function in the respective region, and has connections to matrix theory [2]. In this talk, I will discuss about the error term of the fourth moment of the Riemann zeta function. Using spectral-theoretic approach, Motohashi [3] was able to show that the error term, denoted as $E_2(T)$, is $\ll T^{2/3}(\log T)^8$ and $\int_0^T E_2(T)^2 dt \ll T^2(\log T)^{22}$. Using Ivić bounds for certain sums [1] and our own refinements for Motohashi's method, I and Tim Trudgian were able to improve the exponents of the previous logarithms from 8 and 22 to 3.5 and 9, respectively.

[1] A. Ivić, On the moments of Hecke series at central points. Funct. Approx. Comment. Math., 30:49-82, 2002.

[2] J. P. Keating, & N. C. Snaith, Random Matrix Theory and . Commun. Math. Phys., 214: 57-89, 2000.

[3] Y. Motohashi, Spectral Theory of the Riemann Zeta-function. Cambridge Tracts in Mathematics, 127. Cambridge University Press, Cambridge. 1997.

Jesse Jääsaari (University of Turku)
***On the real zeros of half-integral weight Hecke cusp forms* (15.30-15.50)**

We will discuss recent work concerning the distribution of zeros of half-integral weight Hecke cusp forms of large weight on the surface $\Gamma_0(4)\backslash\mathbb{H}$. In particular, we are interested in the "real" zeros lying on the geodesic segments $\mathrm{Re}(s) = -1/2$ and $\mathrm{Re}(s) = 0$. We will give estimates for the number of these zeros as the weight tends to infinity.