NUMBER THEORY I

Place and time: In M107 on Friday, Jan 5, at 10:30–12:00
Organizer: Anne-Maria Ernvall-Hytönen (Åbo Akademi University)
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On the Riemann-von Mangoldt formula for Selberg class functions

Neea Palojärvi *(Åbo Akademi University)*, `neea.palojarvi@abo.fi`

Abstract. Riemann-von Mangoldt formula describes the number of the nontrivial zeros of the Riemann zeta function. There are generalized versions of the Riemann-von Mangoldt formula for other classes of functions. In this talk, I will discuss an explicit Riemann-von Mangoldt formula for functions in the Selberg class.

On the logarithmic Chowla conjecture

Joni Teräväinen *(University of Turku)*, `joni.p.teravainen@utu.fi`

Abstract. Let $\lambda(n)$ be the Liouville function, which takes values $+1$ and -1 according to the parity of the number of prime factors of n. The function $\lambda(n)$ is a classic example of a multiplicative function and encodes a lot of information about the distribution of the primes. In the 1960s, S. Chowla posed the conjecture that the Liouville function does not correlate with its shifts, that is,

$$\frac{1}{x}\sum_{n\le x}\lambda(n+h_1)\cdots\lambda(n+h_k)=o(1)$$

as $x\to\infty$ for any distinct shifts h_i.

As such, Chowla's conjecture is open for all $k>1$, but in recent years a lot of progress has been achieved on its logarithmically averaged variant. In particular, Tao showed that the logarithmic version of Chowla's conjecture holds for $k=2$, and in joint work we generalized this to the cases where k is odd. I will discuss this joint result, as well as other aspects of Chowla's conjecture.

Joint work with Terence Tao.

A method to compute the bad reduction of Shimura curves

Laia Amorós *(Aalto University)*, `laia.amoros@aalto.fi`

Abstract. Shimura curves arise as a natural generalisation of elliptic curves. As modular curves, they are constructed as Riemann surfaces, and they turn out to have structure of algebraic curve, i.e. they can be described by some algebraic equations with coefficients in some finite extension of Q. Number theorists are interested in the reductions modulo p of these equations. The problem is that these equations are very difficult to compute. I will describe a method to find these reductions without actually knowing the equation.

Joint work with Piermarco Milione.