NUMBER THEORY II

Place and time: In M107 on Friday, Jan 5, at 16:00–17:30
Organizer: Anne-Maria Ernvall-Hytönen (Åbo Akademi University)
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On short sums involving Fourier coefficients of cusp forms

Jesse Jääsaari *(University of Helsinki)*, `jesse.jaasaari@helsinki.fi`

Abstract. Fourier coefficients of cusp forms are interesting objects due to their arithmetic significance and they have been widely studied in the classical GL(2)-setting. In this talk, we will discuss the average behaviour of sums of Fourier coefficients of higher rank Maass cusp forms over short intervals under certain generic assumptions.

On the secrecy function conjecture

Esa Vesalainen *(Åbo Akademi)*, `esavesalainen@gmail.com`

Abstract. We will describe a representation of quotients of ϑ-functions of certain families of ℓ-modular lattices as polynomials of η-quotients, analyse the behaviour of the η-quotients, and show how to combine these to check the modified ℓ-modular secrecy function conjecture for a given lattice from these families.

Joint work with A.-M. Ernvall-Hytönen.

Grassmann algebra in transcendence

Tapani Matala-aho *(University of Oulu)*, `tapani.matala-aho@oulu.fi`

Abstract. The solutions to groups of integer equations with less equations than unknowns can be estimated by using the Thue-Siegel or Siegel's lemma, shortly. Let $\mathcal{V} \in \mathcal{M}_{M\times N}(\mathbb{Z})$ be a non-zero integer matrix, then the equation

$$\mathcal{V}\overline{x} = \overline{0}$$

has a small non-zero integer solution $\overline{x} = (x_1, \ldots, x_N)$ bounded with a non-trivial upper bound depending on the the matrix $\mathcal{V}$. Let $\overline{B}$ be the Grassmann vector of the matrix $\mathcal{V}$ and $\overline{R}$ be the primitive Grassmann vector of the orthogonal complement of the Kernel of $\mathcal{V}$. We will demonstrate that $\overline{B}$ is an integer multiple of $\overline{R}$. This shows that the upper bound of a small solution can be improved by the greatest common divisor of all the $M \times M$ minors of $\mathcal{V}$. Thus we arrive to a special case of the famous Bombieri-Vaaler version of Siegel's lemma.