40th Seminar Aachen-Köln-Lille-Siegen on Automorphic Forms

RWTH Aachen, October 9, 2013

Organizers:

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This is the 40th meeting of the joint French-German intercity seminar on automorphic forms. Everybody who is interested in automorphic forms is welcome. We encourage in particular young researchers to participate and to report on their work in one of our meetings. For further informations concerning this meeting please send an email to *krieg@matha.rwth-aachen.de*

When: Wednesday, October 9, 2013

Where: RWTH Aachen — Hauptgebäude — Hörsaal IV
Templergraben 55, 52062 Aachen

Schedule

14.00 – 14.50   **Pieter Moree (MPI Bonn):**
The second order behaviour of sums of multiplicative functions.

15.00 – 15.50   **Fabien Cléry (Universität Siegen):**
Siegel modular forms of genus 2 and level 2.

16.00   **Coffee and Tea Break**

17.00 – 17.50   **Seyfi Türkelli (Western Illinois University and MPI Bonn):**
Lower bounds for the cohomology of Bianchi groups

18.30   **Dinner**

Abstracts

The second order behaviour of sums of multiplicative functions

Let f be a non-negative multiplicative function. Under rather general conditions there exists a real number A (that may depend on f) such that

$$\sum_{n \leq x} f(n) = C_1(f) x \log^A x + (C_2(f) + o(1)) x \log^{A-1} x.$$

We are interested in $C_2(f)$, which can be seen as a generalization of the Euler-Mascharoni constant γ. In particular, we discuss conjectures on $C_2(f)$ of Ramanujan (with f related to the Ramanujan tau-function) and Yasutaka Ihara (with $\sum_n f(n) n^{-s} = \zeta_K(s)$, $\zeta_K(s)$ the Dedekind zeta function of a cyclotomic number field).
The talk is partly based on joint work with K. Ford and F. Luca (arXiv:1108.3805, Mathematics of Computation, to appear).

Siegel modular forms of genus 2 and level 2

This talk is about a joint work with Gerard van der Geer and Samuel Grushevsky. First, we recall basic facts about scalar-valued Siegel modular forms of genus 2 and level 2, and then we explain how to construct such vector-valued modular forms. We also get into the structure of some modules of vector-valued modular forms over the ring of scalar-valued Siegel modular forms.

Lower bounds for the cohomology of Bianchi groups

Bianchi groups are the congruence subgroups of $\mathrm{SL}(2, O)$ where O is the ring of integers of an imaginary quadratic field. The cohomology of Bianchi groups with certain coeffcient modules are in fact the space of certain automorphic forms of cohomological type.
Very little is known about the cohomology of Bianchi groups. I will talk about a recent result on the dimension of the cohomology of Bianchi groups. More precisely, I will talk about a method, originally due to Harder, and how it is used to give a lower bound for the dimension of these cohomology spaces. I plan to finish the talk with new asymptotic results and some open problems.
This is a joint work with M. H. Şengün.