College seminar

Moduli and automorphic forms, L-functions & Langlands correspondence

Organized by: B. Farang-Hariri

Supervised by: Prof. J. Kramer

Time and place: 13:15 on Wednesdays in room 1.023

Organization of the talks

The principal goal of this college seminar is to get familiar with the main objects involved in the Langlands correspondence. We will restrict ourselves to number field case. Our principal source, which will be our guideline during the seminar, is the survey by Gelbart [1]. We will first start with the automorphic side of the Langlands correspondence, and we will have some overviews on the following subjects during the first 5 weeks: Modular Forms, L-functions, and the Hecke theory of automorphic forms. Then we will study the representations of $SL_2(\mathbb{R})$ in details following [3] in talks 6 and 7. In the 8th talk we will study the automorphic representations of GL_n over the adeles [2]. The 9th talk is devoted to the local Langlands correspondence in number field case [4], [5]. Finally we will have a talk on the functoriality and the trace formula [8].

Talk 1–17/04   **Introduction**
Niels Lindner

Talk 2–24/04   **Modular Forms**
Rostislav Devyatov

-01/05 No talk- Holiday

Talk 3–08/05   **L-functions (I)**
David Ouwenhand

Talk 4–15/05   **L-functions (II)**
Miguel Grados Fukuda

Talk 5–22/05   **Hecke theory of automorphic forms and L-functions**
Fabian Müller

29/05 No talk- "Workshop on Syzygies in Berlin"

Talk 6–05/06   **Representations theory of $SL_2(\mathbb{R})$, (I)**
Nicolas Schmidt

12/06 No talk- "Conference on Heights and moduli spaces"

Talk 7–19/06   **Representations theory of** $\mathrm{SL}_2(\mathbb{R})$**, (II)**
Christian Wald

Talk 8–26/07   **Automorphic representations of** $\mathrm{GL}_n(\mathbb{A})$
Giovanni de Gaetano

Talk 9–03/07   **Local Langlands correspondence for** GL_n**/number field case**
Guilia Battiston

Talk 10–10/07   **Functoriality and trace formula**
Barbara Jung & Banafsheh F-Hariri

References

[1] Gelbart S., An elementary introduction to the Langlands program, Bull. Amer. Math. Soc., 1984

[2] Bump, D., Automorphic forms and representations, Cambridge Studies in Advanced Mathematics, 1997,

[3] Lang, S., $\mathrm{SL}_2(\mathbf{R})$, Graduate Texts in Mathematics, 1985,

[4] Frenkel, E., Lectures on the Langlands program and conformal field theory, Frontiers in number theory, physics, and geometry. II, 2007

[5] Cogdell, J. W., Langlands conjectures for GL_n, An introduction to the Langlands program (Jerusalem, 2001), 2003

[6] Iwaniec, H. and Kowalski, E., Analytic number theory, American Mathematical Society Colloquium Publications, 2004

[7] Silverman, J-H., Advanced topics in the arithmetic of elliptic curves, Springer-Verlag, 1994

[8] Arthur, J., An introduction to the trace formula, Harmonic analysis, the trace formula, and Shimura varieties, Amer. Math. Soc., 2005