



Einladung zur öffentlichen Defensio

Johannes Carl Droschl

Thema der Dissertation

On local and global aspects of the Langlands program

Abstract:

In this thesis we treat three topics situated in the Langlands program. Firstly, we prove rationality results for critical values of L -functions attached to representations in the residual spectrum of $\mathrm{GL}_4(\mathbb{A})$. We use the Jacquet-Langlands correspondence to describe their partial L -functions via cuspidal automorphic representations of the group $\mathrm{GL}'_2(\mathbb{A})$ over a quaternion algebra. Using methods inspired by existing results of Grobner and Raghuram we are then able to compute the critical values as a Shalika period up to a rational multiple. For the second topic, let \mathbb{K}_v be a local non-archimedean field of residue characteristic p and $\overline{\mathbb{F}}_\ell$ an algebraic closure of a finite field of characteristic $\ell \neq p$. We extend the results of [82] concerning \square -irreducible representations of inner forms of $\mathrm{GL}_n(\mathbb{K}_v)$ to representations over $\overline{\mathbb{F}}_\ell$. As applications, we compute the Godement-Jacquet L -factor for any smooth irreducible representation over $\overline{\mathbb{F}}_\ell$ and show that the local factors of a representation agree with the ones of its C -parameter defined in [74]. Moreover, we reprove that the classification of irreducible representations via multisegments due to Vignéras and Mínguez-Sécherre is indeed exhaustive without using the results of [2]. We also characterize the irreducible constituents of certain parabolically induced representations, as was already done by Zelevinsky over \mathbb{C} . Finally, as the last result of the thesis, we prove a conjecture of Kudla and Rallis, see [72, Conjecture V.3.2]. Let χ be a unitary character, $s \in \mathbb{C}$ and W a symplectic vector space over a non-archimedean field with symmetry group $G(W)$. Denote by $I(\chi, s)$ the degenerate principal series representation of $G(W \oplus W)$. Pulling back $I(\chi, s)$ along the natural embedding $G(W) \times G(W) \hookrightarrow G(W \oplus W)$ gives a representation $I_{W,W}(\chi, s)$ of $G(W) \times G(W)$. Let π be an irreducible smooth complex representation of $G(W)$. We then prove

$$\dim_{\mathbb{C}} \mathrm{Hom}_{G(W) \times G(W)}(I_{W,W}(\chi, s), \pi \otimes \pi^\vee) = 1.$$

We moreover give analogous statements for W orthogonal or unitary. This gives in particular a new proof of the conservation relation of the local theta correspondence for symplectic-orthogonal and unitary dual pairs.

Prüfungssenat

Univ.-Prof. Mag. Dr. Andreas Cap
(Vorsitz, Universität Wien)

Univ.-Prof. Dr. Alberto Mínguez Espallargas
(Universität Wien)

Prof. Dr. Binyong Sun
(Zhejiang University)

Prof. Dr. Shaun Stevens
(University of East Anglia)

Zeit und Ort

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