

Seminar on Smooth Representation Theory

I) *General Setting*

In the following 4 talks most definitions and statements are independent of the characteristic. Therefore we assume that we are in the complex case. For later talks we should keep in mind that we can adapt it to the case with positive characteristic.

1) **Locally Profinite Groups and Smooth Representations I:**

Present [2, 1.1] and state the definition of a smooth representation with examples [2, 1.2.1], see also [6, I.1].

2) **Locally Profinite Groups and Smooth Representations II (2 Vorträge):**

Present [2, 1.2], see also [6, I.4].

3) **The Haar Measure:**

Present [2, 1.3], see also [6, I.2].

4) **The Hecke Algebra:**

Present [2, 1.4], see also [6, I.3].

II) *Complex Smooth Representations of Linear Groups over Local Fields for the case $G = GL_2(F)$*

5) **Linear Groups over Local Fields and Representations of the Mirabolic Group:**

Present [2, 3.7-3.8].

6) **Jaquet Modules and Induced Representations:**

Present [2, 3.9].

III) *l -Modular Representations of p -Adic Groups ($l \neq p$)*

7) **Parabolic functors and Cuspidal representations:**

Present [4, II.1.2-II.1.3] until [4, II.1.14]. Especially define cuspidal and supercuspidal representation and show by [4, Example II.1.11] that in general not every cuspidal representation is supercuspidal. Prove [4, Theorem II.1.7], see also [5, Theorem 2.1]. For this you have to state [4, Theorem II.1.5] in more detail, see [5, 1.1.2], [3, 2.8], [6, II.2.18].

8) **Supercuspidal support and Decomposition of $\mathcal{R}_R(G)$:**

State [4, Proposition II.1.15] and give the definition of the supercuspidal support of an irreducible representation [4, after II.1.15]. State [4, Theorem II.2.1] (if you think there is enough time, you can give a sketch of the proof) and [4, Theorem II.2.2]. Explain [4, Example II.2.3]. Present [4, II.2.2] (without proofs).

9) **Superunipotent Representations:**

Present [4, II.3.1.-II.3.3].

IV) *p*-Modular Representations of *p*-Adic Groups

10) Actual Results

Give an overview of actual results [1, I].

REFERENCES

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- [2] C. J. Bushnell, G. Henniart, *The local langlands conjecture for $GL(2)$* , Volume 335 of *A Series of Comprehensive Studies in Mathematics*, Springer-Verlag, Berlin, 2006.
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- [4] W. T. Gan, K. M. Tan, *Modular representation theory of finite and p -adic groups*, Volume 30 of *Lecture Notes Series, Institute for Mathematical Science, National University of Singapore*, World Scientific, New York, 2015.
- [5] A. Mínguez, V. Sécherre, *Représentations lisses modulo l de $GL_m(D)$* , Volume 163 of *Duke Math. J.*, p. 795-887, Duke University Press, 2014.
- [6] M.-F. Vignéras, *Représentations l -modulaires d'un groupe réductif p -adique avec $l \neq p$* , Progress in Mathematics, vol. 137, Birkhäuser Boston Inc., Boston, MA, 1996.