SoSe 2018

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 adopt 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 Voträge):
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]. Therefor 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 $\mathscr{R}_R(G)$:
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

[1] N. Abe, G. Henniart, F. Herzig, M.-F. Vignéras, *A classification of irreducible admissible mod p representations of p-adic reductive groups*, https://arxiv.org/abs/1412.0737, 2016

[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.

[3] J.-F. Dat, *ν-tempered representations of p-adic groups, I:l-adic case*, Volume 126 of *Duke Math. J.*, p. 397-469, Duke University Press, 2005.

[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 Univeristy 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 Mathmatics, vol. 137, Birkhäuser Boston Inc., Boston, MA, 1996.