Basics on Hida Theory

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Timetable: 8 hrs. in total. First lecture on March 18th, 2022, h14:15, Torre Archimede, SR701 (18/3, 22/4) and 2AB40.

Course requirements: Basic knowledge of algebraic number theory, commutative algebra, and complex analysis. Elementary knowledge of modular forms is required.

Examination and grading: Seminar talk about an advanced topic related to the course.

SSD: MAT/02, MAT/03.

Aim: Present the basics on the theory of families of modular forms, as developed by Hida.

Course contents: We present the notion of p-adic modular forms and provide the naive definition of the weight-space as given by Serre. Starting with the definition of ordinary modular forms, we then define families of ordinary modular forms and briefly state their relation with Hecke algebras. Time permitting, we examine the approach via Galois representations.

Bibliography:

1. Greenberg, R. and Stevens, G., *p-adic L-functions and p-adic periods of modular forms*, Invent. Math. 111 (1993), no. 2, 407–447.

2. Hida, H., *Elementary theory of L-functions and Eisenstein series*, London Mathematical Society Student Texts, 26. Cambridge University Press, Cambridge, 1993. xii+386.

3. Serre, J.-P., *Formes modulaires et fonctions zêta p-adiques*, Modular functions of one variable, III (Proc. Internat. Summer School, Univ. Antwerp, 1972), pp. 191–268, Lecture Notes in Math., Vol. 350, Springer, Berlin, 1973.

4. Wiles, A., *On ordinary λ-adic representations associated to modular forms*, Invent. Math. 94 (1988), no. 3, 529–573.