Plan for the Fall 2015 seminar: Galois representations

Eyal Goren, Henri Darmon, Adria Iovita

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We are going to use the paper of Jared Weinstein, *Reciprocity laws and Galois representations: recent breakthroughs* as a skeleton for the lectures this term. The idea is to, on the one hand, follow Jared's paper and, on the other hand, go wonderfully tangential to it by exploring further various topics appearing in the paper.

(I). Introduction (Eyal. Sept. 10). Overview of Jared's paper.

(II). §§2.1-2.2 (Sami. Sept. 21). Reciprocity laws.

(III). §§3.1-3.3 (Ervin. Sept. 28). Some algebraic number theory and the reciprocity map.

(IV). §§3.4-3.6 (Fabian. Oct. 5). Artin, p-adic and geometric Galois representation.

(V). §§4.1-4.2 (Clara. Oct. 19). Modular forms and theta functions.

(VI). (Nicolas. Oct. 26) More on theta functions and modular forms of weight 1.

(VII). §§4.3-4.4 (Billy. Nov. 2). Hecke Operators and Galois representations.

(VIII). §§4.5-4.6 (Manal. Nov. 9). Modular Galois representations.

(IX). §4.7 (Shan. Nov. 16). Automorphic forms.

(X). §§5.1-5.3 (Nicolas. Nov. 23). Arithmetic manifolds.

(XI). §§5.4-5.5 (Michele. Nov. 30). Shimura varieties and the Borel-Serre compactification.

(XII). §5.6 (Bruno. Dec. 7). Rigid analytic spaces and their cohomology.

(XIII). §5.7 - ϵ (Galen. Dec. 14) Introduction to adic spaces.

(XIV). §§5.7-5.8 (Alice. TBD). Perfectoid spaces and Shimura varieties at infinite level.

(XV). Conclusion (Henri. TBD).

Some references:

1. Ireland and Rosen, *A classical introduction to modern number theory. Second edition. Springer. Graduate Texts in Mathematics, 84.*
2. Serre, Jean-Pierre, *On a theorem of Jordan. Bull. Amer. Math. Soc. 40 (2003), no. 4, 429-440.*
3. Arthur, James, *The principle of functoriality. Bull. Amer. Math. Soc. (N.S.) 40 (2003), no. 1, 39-53.*
4. Serre, J.-P. *A course in arithmetic. Graduate Texts in Mathematics, No. 7.*
5. Serre, J.-P., *Modular forms of weight one and Galois representations. Algebraic number fields: L-functions and Galois properties (Proc. Sympos., Univ. Durham, Durham, 1975), pp. 193-268. Academic Press, London, 1977.*
6. Lang, S., *Algebraic number theory, Graduate text in mathematics, No. 110. 1994.*
7. Gelbart, S., *An elementary introduction to the Langlands program, Bull. AMS, 1984.*
8. Bump, et al., *An introduction to the Langlands program. Lectures presented at the Hebrew university of Jerusalem. Birkhauser 2003*.
9. Darmon, H., Diamond, F. and Taylor, R., *Fermat's last theorem. Elliptic curves, modular forms & Fermat's last theorem (Hong Kong, 1993). Int. Press, 1997.*
10. Diamond, F. and Shurman, J., *A first course in modular forms. Graduate text in mathematics, 228 (2005).*
11. Iwaniec, H., *Topics in classical automorphic forms. Graduate studies in mathematics, 17. AMS, 1997.*