

Seminari de Teoria de Nombres de Barcelona Barcelona, 5-9 February 2024

## Universal deformations of representations

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In his article [1], Barry Mazur studied what are the possible liftings of a representation  $\rho : G_{\mathbb{Q},S} \to GL_n(\mathbb{F}_p)$  to a *p*-adic representation  $\rho : G_{\mathbb{Q},S} \to GL_n(\mathbb{Q}_p)$ . To do so, he prove that under suitable conditions on the representation  $\rho$ , there exist a universal ring for the representation, R, and a universal representation  $\tilde{\rho} : G_{\mathbb{Q},S} \to GL_n(R)$  such that any representation  $\rho' : G_{\mathbb{Q},S} \to GL_n(A)$  where A is complete noetherian local ring with residue field  $\mathbb{F}_p$ , can be obtain from the universal one  $\tilde{\rho}$ . The main tool in the proof is a powerful theorem of Schlessinger [2] that states under which conditions a functor from artin rings to sets is pro-representable. **Our aim in this talk will be to explain in detail this theorem of Schlessinger**.

- 1 -Mazur, Barry Deforming Galois representations, in: Galois Groups over Q, Y. Ihara, K. Ribet, J-P serre, eds, MSRI Publ. 16, Springer-Verlag, New York, Berlin, Heidelberg (1989), 385-437
- 2 -Schlessinger, Michael; Functors on Artin rings, Trans American Mathematical Society 130 (1968), 208-222