Math 205-The Fargues-Fontaine Curve

September 28, 2018

Several years ago, Fargues and Fontaine discovered a remarkable geometric object X, which plays an essential role in p-adic analytic geometry. This object, now known the *Fargues-Fontaine curve*, has close connections with local class field theory, p-adic Hodge theory, the theory of perfectoid spaces, and the local Langlands program. The goal of this course is to define the Fargues-Fontaine curve X, to establish its basic properties, and to understand the classification of vector bundles on X. If time permits, we may delve deeper into other aspects of the subject (depending on the interests of the audience).

Instructor: Jacob Lurie (lurie@math.harvard.edu). Office hours by appointment.

Time/Place: MWF 9:00-9:50, APM 5402.

Course Website: http://www.math.harvard.edu/∼lurie/205.html

Likely Topics:

- Perfectoid fields
- Tilting
- Period rings
- The "fundamental exact sequence" of p-adic Hodge theory
- The Fargues-Fontaine curve and its properties
- Classification of vector bundles on the Fargues-Fontaine curve

Possible further topics:

- p-divisible groups and vector bundles on the Fargues-Fontaine curve
- p-adic Hodge theory
- The Colmez-Fontaine theorem
- The twistor space analogy
- Local class field theory via the Fargues-Fontaine curve
- Banach-Colmez spaces