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Introduction to parahoric torsors

The notion of a parahoric group was originally introduced by Bruhat and Tits in an arithmetic context, where the problem of finding useful integral versions for e.g., a rational vector space equipped with a quadratic from appears in many situations.

Pappas and Rapoport explained that in geometry, these notions also allow to put an interesting class of moduli problems of bundles on curves equipped with various kinds of extra structure into a common framework, as moduli of bundles for parahoric groups. They conjectured that these moduli spaces share many features that are known for moduli spaces of principal bundles.

In these lectures I will try to motivate the notion starting from this geometric perspective, and introduce the basic constructions used by Bruhat-Tits in a geometric setup.