Kolloquium über Reine Mathematik

Einladung zu einem Vortrag

Dienstag, 18.Januar 2022

17 Uhr, virtuelles Meeting mit
[Zoom](#)

Meeting ID: 699 9726 9389
Passwort: 81505154

Prof. Dr. Petra Schwer

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Building bridges between Geometry and Algebra

Abstract:

Groups like GL_n, SL_n or SP_n play an important role in many areas of mathematics. It has bee known for a long time that some of their properties (when studied over the reals or complex numbers) are best understood via the associated symmetric spaces. Jaques Tits later introduced buildings as a tool to study the respective groups over other field and developed, together with Bruhat, a theory that also captures reductive groups evaluated over non-archimedian local fields with discrete valuation, like the p-adic numbers.

In this talk I will explain how some of the subgroup structures of such a reductive group over a non-Archimedian local field can be explained via Coxeter combinatorics and the geometry of an (affine) Bruhat-Tits building, its apartments and retractions. The building for example simultaneously encodes the (affine) flag variety and (affine) Grassmannian associated to the group. But it also permits to explain more complicated structures such as representation theoretic

data or other associated varieties in purely combinatorial terms.

The underlying structure of a building is Coxeter groups and their associated Coxeter complex. A simplicial complex on which the groups act in a good way. We will discuss some of the combinatorial properties of Coxeter groups and buildings and explain how they can be used to study varieties attached to the mentioned algebraic groups. We will do so by looking at two examples: nonemptiness and dimensions of affine Deligne Lusztig varieties (ADLVs) can be computed with the help of Coxeter group combinatorics. The ADLVs are sub-varieties of the affine flag variety of an algebraic group. And their nonemptiness can be stated in terms of galleries and their retracted images in the associated Bruhat-Tits building. In addition we will talk about the problem of exact computation of reflection length in affine Coxeter groups. Here reflection length means the minimal number of elements needed to write a given element as a product of reflections. Surprisingly this notion is closely related to dimensions of an ADLV.

Vor dem Vortrag (ab 16.30 Uhr) besteht das Angebot auf ein Treffen zu einem virtuellen Tee. Dafür wird der Raum um 16:30 Uhr geöffnet.