Oberseminar: Anosov Representations.

A well studied class of discrete subgroups of Lie groups is that of lattices (discrete subgroups with finite covolume). The aim of this seminar is to investigate a class of discrete subgroups (with possibly infinite covolume) with the following desirable properties:

- the existence of examples with interesting geometric interpretation; • a good control of the subgroups under deformations;
- interesting dynamics on certain homogeneous spaces.

This class is that of Anosov subgroups. We will follow the notes "Discrete subgroups of semisimple Lie groups, beyond lattices" by F. Kassel ([Kas24]). A (preliminary) distribution of the talks is the following:

1. **Paul Vögele: Lattices, deformations and rigidity**
(pp 1-13) (118-130) The goal of this introductory talk is to review properties of lattices Γ in
semisimple Lie groups G (such as Margulis superrigidity) and to discuss
their continuous deformation in Hom(Γ, G).
2. **Daniel Funck: Schottky and quasi-Fuchsian groups, Hitchin representations and higher Teichmüller theory**
(pp 13-30) (130-147) Schottky and quasi-Fuchsian groups are concrete examples of interesting discrete subgroups, which are not lattices, acting on hyperbolic spaces. Hitchin representations are the first higher rank example we encounter, and Anosov representations were in fact originally introduced by Labourie in his study of such representations.
3. **Giacomo Gavelli: Geometrically finite and convex-cocompact subgroups**
(pp 30-40) (147-157) These are two important classes of finitely generated discrete subgroups. for which we discuss a general theory. We will later see that Anosov representations are the "correct" higher rank generalization of convex-cocompact subgroups.
4. **Anton Deitmar: Anosov subgroups**
(pp 41-52) (158-169) We finally introduce Anosov subgroups (resp. Anosov representations) and discuss the associated dynamics on certain flow spaces, generalizing the rank 1 case of the geodesic flow on a convex-cocompact manifold.

5 Giacomo Gavelli: Anosov representations and convex-cocompactness
(pp 52-59) (169-176) We further investigate the relationship between Anosov and convex-cocompact subgroups, discussing how it is possible to provide a geometric characterisation of Anosov representations in terms of a suitable notion of convex-cocompactness.

Primary source: [Kas24].

References

[Can21] Richard Canary. Anosov representations: Informal lecture notes, 2021.
https://pagine.dm.unipi.it/~a019210/Canary_Survey_Anosov.pdf

[Kas24] Fanny Kassel. Discrete subgroups of semisimple lie groups, beyond lattices.
arXiv preprint arXiv:2402.16833, 2024.

[Mon25] Daniel Monclair. Locally homogeneous flows and anosov representations. 2025.

1. https://www.youtube.com/watch?v=IJy9rZcC1mw
2. https://www.youtube.com/watch?v=HawiZK5NiPI
3. https://www.youtube.com/watch?v=cT8YjiKSgTs
4. https://www.youtube.com/watch?v=vfEIfQQD-hg
5. https://www.youtube.com/watch?v=4Gz3YiXvy2Y