FIM Nachdiplomvorlesung

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Hyperbolic flows

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HG G 19.1, ETH Zürich, Rämistrasse 101

Abstract

The first nontrivial example of an ergodic mechanical system was the motion of a free particle in a negatively curved space. The underlying mechanism is hyperbolicity. Smooth ergodic theory has since broadened its scope well beyond uniformly hyperbolic systems, but these provide rich context for investigations connecting dynamical systems to geometry and topology. The lectures present a panorama of such work for uniformly hyperbolic flows. The course begins with a brisk introduction to topological dynamics and ergodic theory of flows and the study of these both for hyperbolic flows. The emphasis will be on continuous-time systems and sometimes their interplay with discrete-time systems.

The first core component of the course then surveys a broad array of mathematics centered on the invariant foliations central to hyperbolic behavior. This centers on their regularity as well as smooth and geometric rigidity. This has a rich interface with geometry.

The second core component studies constructions of Anosov flows, some of them quite recent, which showcases deep interactions of dynamics with low-dimensional topology.

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