

Educational summary of the project “Proper actions of discrete subgroups on homogeneous spaces”

Assume that we have a *geometric object*, which locally looks like \mathbb{R}^n and on which it is possible to define and study *differentiable maps*. This object, with additional formal requirements, is called a smooth manifold. It is possible to define *geometric structures* on a smooth manifold such as metric (a metric allows one to measure distance on a given manifold). All maps from the manifold to itself which do not alter the specified geometric structure, form a group (a set with an operation on its elements), which we denote by G . If for any two points on the manifold there exists a map in G which takes one point to another then the manifold is called a homogeneous space with the given geometric structure. The aim of this project is to study properties (namely restrictions on the fundamental group) of a manifold, which locally looks like our homogeneous space, with the given geometric structure. Research carried out in this project can answer an interesting - from the mathematical point of view - question of the relationship between the local structure of a manifold with its global properties.