Prof. Dr. Sebastian Hensel

Global Riemannian Geometry (Riemannian geometry II)

Lecture WiSe22/23

This lecture will continue the course "Riemannian geometry" taught by Prof. Leeb in the summer semester 2022.

We will explore *global* aspects of Riemannian geometry. The first part of the course will cover classical results relating (local) curvature bounds to the (global) topology of the manifold. In particular, we will discuss the Hadamard theorem (showing that simply connected, complete, non-positively curved manifolds are already $\mathbb{R}^n$) and the theorem by Bonnet-Myers (showing that complete, positively curved manifolds are compact).

In a second part, if time permits, we will discuss *comparison geometry*, which provides a geometric interpretation of curvature bounds by comparing geodesic triangles in a manifold to those in a constant curvature space.

For: Master's students in mathematics or physics, TMP students

Prerequisites: Course "Riemannian geometry"

References: (list will be updated)

- Gallot, Hulin, Lafontaine, *Riemannian geometry*, Springer, 1987
- do Carmo, *Riemannian Geometry*, Birkhäuser, 1992
- Cheeger, Ebin, *Comparison theorems in Riemannian geometry*, North-Holland, 1975
- Karcher, *Riemannian comparison constructions*, in: S.S.Chern (ed.): Studies in Global Geometry and Analysis, M.A.A. Studies in Mathematics, vol. 27 (1989)

Location,Time,Form: The course will be offered in-person as a 2SWS course, on *Wednesday, 2-4* in room *B132*. We can discuss possible module codes depending on the participants.