

Spaces and Moduli Spaces of Riemannian Metrics

Seminar Announcement for the winter term 2022/23

Contents

Consider a smooth manifold M with a Riemannian metric satisfying some sort of geometric constraints like, for example, having positive scalar curvature, non-negative Ricci or sectional curvature, negative sectional curvature, being Einstein, Kähler, Sasaki, of special holonomy, etc.

A natural question to ponder is then what the space of all such metrics on M looks like. One can also ask a similar question for its moduli space, i.e., its quotient by the full diffeomorphism group of M , acting by pulling back metrics. These spaces are customarily equipped with the topology of smooth convergence on compact subsets and the quotient topology, respectively. The topological properties of these objects hence provide the right means to measure "how many" different metrics and geometries the manifold M does exhibit, and since Weyl's early result on the connectedness of the space of positive Gauß curvature metrics on S^2 and the foundations of Teichmüller, infinite-dimensional manifold and Lie group theory, uniformization and geometrization, the study of spaces and moduli spaces of metrics has been a topic of interest for differential geometers, global and geometric analysts and topologists alike.

The seminar will provide an overview about the basic results and open questions in this important field of research and also prepare interested participants for writing a master thesis in this subject.

Dates Wednesdays 11:30-13:00 in SR 2.058, starting on October 26, 2022

Prerequisites Sound knowledge of basic results and concepts from differential geometry as well as algebraic topology

Literature

Mauricio Bustamante and Jan-Bernhard Kordaß, *Spaces of Riemannian Metrics*
(to get a first idea about the subject)

Wilderich Tuschmann and David Wraith, *Moduli Spaces of Riemannian Metrics*
(the monograph on which the seminar and talks will be based)

Preliminary Meeting and Talk Assignment Thursday, July 28 at 14:00 (2 pm) in SR 2.059