EBERHARD KARLS
UNIVERSITÄT
TÜBINGEN

Mathematisch-
Naturwissenschaftliche
Fakultät
Fachbereich Mathematik
AB Geometrische Analysis und
Mathematische Relativitätstheorie

Sommersemester 2020

Riemannian Geometry

Instructor: Dr. Armando Cabrera Pacheco
Start: Tuesday, April 14th
Time and place: 10 c. t. to 12, in C-Building Room 4H33
Exercises sessions TBA

Description

The main goal of this course is to gain a working understanding of some of the classic topics in Riemannian Geometry.

The course will start by introducing the notion of Riemannian metrics and we will build some intution via concrete examples. Then we will study connections, geodesics and curvature from a classical point of view. If time permits, some connections to geometric analysis and mathematical relativity will be discussed.

Special attention will be given to building intuition and becoming familiar with classical computations in Riemannian Geometry and Differential Geometry.

Requirements

Geometry in Physics / Differential Geometry or equivalent.

Literature

Lee, J. M., *Riemannian manifolds: An introduction to curvature*, Graduate Texts in Mathematics **176**, Springer-Verlag New York, 1997.

O'Neill, B., *Semi-Riemannian geometry. With applications to relativity*, Pure and Applied Mathematics **103**, Academic Press, Inc., New York, 1983.

Petersen, P., *Riemannian Geometry*, Graduate Texts in Mathematics **171**, Springer, Cham, 2016.

* This is not an extensive list. We will mainly follow Lee's book and take parts of other references.

Exam

Exercises will be assigned regularly and graded and a final (written) exam will be given at the end of the semester (this is subject to change, i.e., to an oral exam, depending on the number of students of the class). The final grade will be computed as follows: max(100% final exam, 40% exercises + 60% final exam).