FALL 2017
MATH 80750
KARSTEN GROVE

TOPICS IN DIFFERENTIAL GEOMETRY: SYMMETRIC SPACES

Symmetric Spaces are the jewels of Riemannian Geometry and constitute important objects also in Analysis, (Linear) Algebra, Algebraic Geometry and Topology, as well as in Physics. Each symmetric space has its own special geometry: Euclidean, spherical and hyperbolic geometry are only the very first examples. On the other hand these spaces have much in common, and there is a rich theory for them including a classification.

Symmetric spaces can be considered from many points of view. We will cover basic descriptions and properties and then focus on their geometry and how they relate to other topics possibly including various rigidity results, holonomy etc.

The topics covered can be adapted to the interest and background of the participants.

Prerequisits: Basic Riemannian Geometry corresponding for example to MATH 60670. Also a basic knowledge of Lie groups will be good, but is not expected as we can deal with it when needed.

References

Bits and pieces from many sources will be used for the course. These include treatments found in the books

- *Riemannian Geometry*, P. Petersen, Graduate Texts in Mathematics 171, Thrird edition, Springer-Verlag.
- *Lectures on Kähler Manifolds*, W. Ballmann,ESI Lectures in Mathematics and Physics, EMS.
  people.mpim-bonn.mpg.de/hwbllmnn/archiv/kaehler0609.pdf

As well as a number of beautiful contribution due to J. Eschenburg (available at the website below) including

- *Lecture Notes on Symmetric Spaces*, J. Eschenburg
  https://www.math.uni-augsburg.de/emeriti/eschenburg/