Math 240B
Course Outline and Information

Lecture: MWF 11-11:50am, SH4607


Instructor: Guofang Wei, South Hall 6503
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Office hours: MW 12:15-1:15pm, F 8:50-9:50am or by appointment

Homework: There will be about five homework assignments, which will also be posted on my web page http://www.math.ucsb.edu/~wei.

Grades: 25% homework; 30% midterm (take home); 45% final (take home)

Course Material: Chapters 1-8 of book by M. P. do Carmo

Course outline: We will first introduce the basic concepts: Riemannian metric, Riemannian connection, geodesics, and curvature. A lot of geometrics information can be derived from our understanding of geodesic and the interaction of geodesics and curvature is our primary concern. At the most fundamental level this interaction is exhibited by what are called Jacobi fields.

We then start the study of global geometry with another very important concept: completeness. Its characterization by the so called Hopf-Rinow theorem is the most fundamental result in Riemannain geometry. After looking into spaces of constant curvature, if time permits, we will study the geometry of geodesics via the calculus of variation.

J. Cheeger, D. Ebin, Comparison Theorems in Riemannian geometry, 1975.
M. Spivak, A comprehensive introduction to differential geometry, Volume 1-5.
Gromoll, Klingenberg, Meyer, Riemannche geometrie im grossen.