

## Math 7210: Riemannian Geometry – Homework 4

Due in class: Wednesday, September 25, 2019

1. Exercise #2.2 of do Carmo's *Riemannian Geometry*. (This explains how a connection can be obtained from a concept of parallelism.)
2. Exercise #2.3 of do Carmo's *Riemannian Geometry*. (This explains how the Riemannian connection  $\nabla$  associated to the induced Riemannian metric on a submanifold, relates to the Riemannian connection  $\bar{\nabla}$  on the ambient manifold. In particular, it justifies the claim I made in class that the connection  $\nabla$  on the submanifold is basically obtained by applying the connection  $\bar{\nabla}$  in the ambient manifold and then orthogonally projecting to the tangent bundle of the submanifold.)
3. Exercise #2.6 of do Carmo's *Riemannian Geometry*.
4. Exercise #2.8 of do Carmo's *Riemannian Geometry*, parts (a) and (b).

I also recommend that you think about exercises #2.4 and #2.5 if you have time.