



HW#5 Due Wed April 8

1. Consider the hyperbolic line coordinatized (in the Poincaré upper half-plane model) by the circular arc

$$(x - a)^2 + y^2 = r^2, \quad y > 0$$

as in the related handout.

- (i) Give an explicit parameterization of the line in the form $(x(s), y(s))$ using arc length s .
- (ii) Using (i), determine the distance between the points $(-1, 1)$ and $(1, 1)$ in this model of the hyperbolic plane. (You will first need to identify the geodesic between the two points.)

Also from Kühnel, Chapter 5 (p.233–237) answer #7, 12, 20.

Depending on how future classes go, I may later assign further exercises from Chapter 5 (e.g. on holonomy, tangent bundles or Riemannian connections).

Have a great Spring Break!