Active learning Session 8

The goal of this problem set is to build your intuition regarding covering spaces. As such, in the first four problems, detailed proofs are not expected.

Problem 1

Draw a picture illustrating that the torus T^2 arises a 2-sheeted cover of the Klein bottle K.

Problem 2

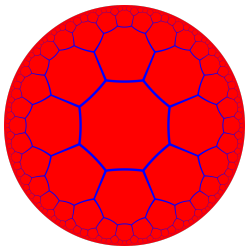
Draw a picture illustrating that illustrates a simply-connected cover X of the Klein bottle K.

Problem 3

Outline the classification of the covering spaces of the Möbius band.

Problem 4

What does this picture tell you about covering spaces of a familiar surface ?



Problem 5

Prove that a covering map $p\colon E \to B$ is a local homoemorphism : for every $e \in E$ there exists an open set $V \subset E$ containg e such that $f(V) \subset B$ is open and $f|_V : V \to f(V)$ is a homeomorphism.