MAT 530 Topology, Geometry I

Problem Set 12

due Friday, December 11

Hatcher, questions 12, 14 p.80; question 27, p.82 (we will discuss deck transformations on Monday).

1. Describe (with proof) the group of deck transformations for the follwong coverings. Describe also how the deck transformations act.

(a) all the coverings you constructed in question 14 p.80

(b) the universal covering and the 5-fold covering of the sphere with the north and south poles identified. (You described those coverings in the previous homework; now you can use those coverings without proof. If you had trouble with the corresponding question of hw 11 and do not know what those coverings look like, please ask me, I'll be happy to explain.)

2. Prove that the countable infinite product $(S^1)^\omega = S^1 \times S^1 \times S^1 \times ...$ (with the product topology) has no simply-connected covering.

Read in Munkres about the Ulam–Borsuk theorem, and do questions 1, 3 §57.