

Algebraic topology, Fall 2014

Homework 3, due Monday, September 29

Read Fuchs, Fomenko, Gutenmacher's textbook "Homotopy topology" starting with §6 Homotopy groups, on page 49 (pdf file page 46) until and including §8, which ends on page 66.

1. Prove that the sequence of the homotopy groups of a pair (X, A) is exact (we proved some cases in class, finish the proof).
2. Give an example of a nontrivial fiber bundle $p : E \rightarrow B$ ("non-trivial" means not isomorphic to a direct product $B \times F$) with base a CW-complex B and a surjective map of CW-complexes $f : B' \rightarrow B$ such that the pull-back bundle $f^*(E)$ is trivial.
3. Prove the "five lemma", which is exercise 5 on page 65 of [FFG].

Exercises 7 and 8 in [FFG] page 65.

Exercises 1, 3, 4, 5 in [FFG] page 68 (exercises on page 68 are not numbered, count from the top).