

MAT8201, Algebraic Topology

Assignment 2

Due in-class on Friday, March 7

Numbered exercises are from Hatcher's "Algebraic Topology."

1. Verify that the geometric realization given in class is a functor from the category of Δ -sets to the category of topological spaces.
2. Compute the simplicial homology groups $H_n(\mathbb{RP}^2; \mathbb{Z})$ using the Δ -complex structure given in class.
3. Hatcher, Exercise 4 on page 131.
4. Suppose $f: A \rightarrow B$ and $g: B \rightarrow C$ are homomorphisms of abelian groups. Show that there is an exact sequence

$$0 \rightarrow \ker(f) \rightarrow \ker(gf) \rightarrow \ker(g) \rightarrow \operatorname{coker}(f) \rightarrow \operatorname{coker}(gf) \rightarrow \operatorname{coker}(g) \rightarrow 0$$