

Math 60440: Basic Topology II

Problem Set 6

1. Let A_\bullet be a chain complex of finite type. Prove that $\chi(A_\bullet) = \sum_{n=0}^{\infty} (-1)^n \text{rank}(H_n(A_\bullet))$.
2. Let \mathbb{X} be a semisimplicial set. Make the geometric realization $|\mathbb{X}|$ into a CW complex in the obvious way. Prove that $C_\bullet(\mathbb{X}) \cong C_\bullet^{\text{cell}}(|\mathbb{X}|)$.
3. Do the following problems from Hatcher:
 - For these problems, don't use simplicial homology or Δ -complexes, but rather use either cellular homology/CW complexes or the axioms for homology.
 - Section 2.1, problems 4, 6, 9.
 - Section 2.2, problems 17, 19.