

Introduction to algebraic topology, Spring 2013

Quiz 2, Tuesday April 23

Name: _____

1. (30 points) For each space below, determine its homology groups and the Euler characteristic.

(a) Discrete topological space with two points $X = \{p_1, p_2\}$.

(b) $\mathbb{R}^3 \setminus \{0\}$

(c) The Möbius band.

(d) $S^1 \vee S^3$, wedge (one-point union) of a 1-sphere and a 3-sphere.

2. (10 points) Topological space Y is path-connected and its fundamental group $\pi_1(Y)$ is isomorphic to S_3 (the permutation group of a 3-element set). What can you say about $H_0(Y)$ and $H_1(Y)$?

Extra credit:

I. Take an n -simplex and remove all of its vertices ($n + 1$ vertices). Denote by X the resulting topological space. What is the Euler characteristic of X ?