Homework 8

Due Friday, March 18, 2011

1. Let $S$ be the $\Delta$-complex below, where the two edges labelled $\tau_i$ are glued together for $i = 1, 2, 3$, and similarly for the vertices $\eta_i$.

What is the topological space underlying $S$? Compute its simplicial chain complex and homology groups.

2. What is the following $\Delta$-complex?

Write down its simplicial chain complex, and so compute its rational homology.

Show that $\tau_1 + \tau_2$ is a 1-cycle, and that $2(\tau_1 + \tau_2)$ is a boundary. Using this show that its integral homology groups are $H_0 = \mathbb{Z}$, $H_1 = \mathbb{Z}/2\mathbb{Z}$, $H_2 = 0$.

Compare with the appropriate calculation in lectures.