EXERCISE SHEET 3

GRAPH COMPLEXES, SUMMER 23, HU BERLIN

Please prepare to present your solutions in the exercise session on June 16th.

Exercise 1. Finish the proof of Theorem 4 (i).

Exercise 2. Show that the n-cube $[0,1]^n$ can be triangulated into $n!$ n-simplices. (If you need a hint, check page 112 in Hatcher's book 'Algebraic Topology'.)

Exercise 3. Prove the following lemma from the third lecture.

Lemma. Let S^n denote the n-sphere, D^n denote the n-disk. Let Γ be a finite linear group acting on S^n by permuting the coordinates of $\mathbb{R}^{n+1}$. Then

$$H_\bullet(S^n/\Gamma;\mathbb{Q}) = \begin{cases} H_\bullet(D^n;\mathbb{Q}) & \text{action induces orient.-reversing homeomorphisms,} \\ H_\bullet(S^n;\mathbb{Q}) & \text{else.} \end{cases}$$

Exercise 4. Find the dimensions of $\Delta_{g,n}$, $\Delta_{g,n}^{>0}$, $\Delta_{g,n}^{0}$,and $S_{g,n}$.