

## Sheet 8

### Question 8.1

Consider a map  $\alpha : [m] \rightarrow [n]$  in  $\Delta$  and the induced map  $\alpha_* : \Delta^m \rightarrow \Delta^n$ . Let  $f$  be a continuous function on  $\Delta^n$ . What is the function  $f \circ \alpha_*$  in the following two cases:

- $m = n - 1$  and  $\alpha$  is  $\epsilon_i$  for some  $i = 0, \dots, n$ .
- $m = n + 1$  and  $\alpha$  is the surjection  $\eta_j$  for some  $j = 0, \dots, n$ .

### Question 8.2

What is the cohomology of  $C^*(\Delta[n])$ ?

### Question 8.3

Let  $C$  be a set. Show that  $\text{Hom}(-, C) : \text{Set}^{\text{op}} \rightarrow \text{Set}$  is a left adjoint. What is the right adjoint?

### Question 8.4

Check some of the conditions that  $h$  as defined in Lemma 6.7 is indeed a contracting homotopy.

**These questions will be discussed in the exercise class on 11.1.20.**

Questions with an asterisk are more challenging.