

## Workshop 1: Simplicial homology

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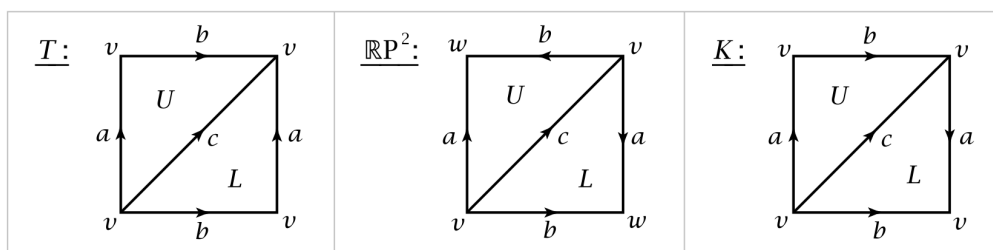


Figure 1:  $\Delta$ -complexes homeomorphic to the torus  $T$ , the real projective plane  $\mathbb{R}P^2$  and the Klein bottle  $K$ , respectively.

**Exercise 1** (Torus).

1. Describe the boundary maps  $\partial_2$  and  $\partial_1$  for the  $\Delta$ -complex homeomorphic to  $T$  in Figure 1.
2. Compute  $H_0^\Delta$ ,  $H_1^\Delta$  and  $H_2^\Delta$ , where  $H^\Delta$  denotes simplicial homology.

**Exercise 2.** Do the same for the projective plane  $\mathbb{R}P^2$

**Exercise 3.** Do the same for the Klein bottle  $K$ .