

**ALGEBRAIC TOPOLOGY IV || EPIPHANY 2020**  
**PROBLEM SHEET 6**

Please solve this problem during week 17. This problem will form part of the next homework.

**Problem 1.** Calculate the cohomology ring of the genus 2 closed surface  $\Sigma_2$ .

Either work directly with the definition, or use a map  $\Sigma_2 \rightarrow T^2 \vee T^2$  that crushes a circle to a point, and make use of your knowledge of the cohomology ring for  $T^2$ . With the second method, the first task is to compute the induced map on cohomology groups  $H^k(T^2 \vee T^2; \mathbb{Z}) \rightarrow H^k(\Sigma_2; \mathbb{Z})$ .