

MATH 611
PROBLEM SET 5

Due: Thursday December 1, 2022

1. Suppose that Y is a compact orientable surface of genus g . Suppose that D_1, \dots, D_n are $n > 0$ disjoint closed disks embedded in Y . Let

$$X = Y - \bigcup_{j=1}^n \overset{\circ}{D}_j.$$

That is, X is a genus g surface with n boundary components, each of which is a circle. Compute

$$H_\bullet(X; R) \text{ and } H_\bullet(X, \partial X; R)$$

where ∂X denotes the boundary of X , which is the disjoint union of n circles.

2. Let X be a compact orientable surface of type described in the previous in the previous problem. Let Z be the surface obtained by attaching n Möbius bands to X , one to each of its boundary components. Compute the integral and \mathbb{F}_2 homology of Z .