MATH 4910/5010 Exercises for First Presentation

Presentation Exercise 1: Let X be $\mathbb{R}^n - \{\mathbf{0}\}$. Explicitly write a deformation retraction from X to S^{n-1}.

Presentation Exercise 2: Given two surfaces S_1 and S_2, compute the Euler characteristic of the connect sum of S_1 and S_2 in terms of $\chi(S_1)$ and $\chi(S_2)$. What is the Euler characteristic of a compact 2-sided genus g surface without boundary?

Presentation Exercise 3: Given a finite set of points P in a metrix space R^n, what is the minimal value of r, in terms of distances between points in P, such that $\mathbb{VR}^r(P)$ has connected underlying space. Draw a picture to illustrate your answer.

Presentation Exercise 4: Consider a k-simplex σ. Explicitly compute $\partial_{k-1} \circ \partial_k \sigma$.

Presentation Exercise 5: Compute the Betti numbers for S^3. Note that S^3 is the boundary of a 4-simplex.