

Homework 5

Due: Feb 28

1. Hatcher, *Spectral Sequences* : p.51–Exercise 1
2. Compute the cup product structure in $H^*(\Omega S^n; \mathbb{Z})$ using the Serre spectral sequence for the path fibration.
3. Milnor-Stasheff: 9-A
4. Milnor-Stasheff: 9-B
5. Milnor-Stasheff: 9-C
6. Let M be an oriented, smooth manifold, $f : M \rightarrow \mathbb{R}$ a Morse function and p a critical point of f . Let Z be the zero-section of TM and Γ the graph of the gradient of f . Show that the sign of the intersection point $p \in Z \cap \Gamma$ is $(-1)^{\text{ind}(p)}$.