Problem Set 5   Math 758

Spring 2012   Jim Fowler

The exercises below should be handed in on Monday.

Problem 5.1 (Hatcher page 259 problem 22)

Show that $H_c^n(X \times \mathbb{R}; G) \cong H_c^{n-1}(X; G)$ for all n.

Problem 5.2 (Hatcher page 260 problem 26)

Compute the cup product structure in $H^\star(S^2 \times S^8 \# S^4 \times S^6)$.

Problem 5.3

Use Poincaré duality to compute the cup product structure in $H^\star(\mathbb{C}P^k)$.

Problem 5.4 (Hatcher page 260 problem 32)

Show that a compact manifold does not retract onto its boundary.

Problem 5.5 (Hatcher page 260 problem 33)

Show that if M is a compact contractible n-manifold, then ∂M is a homology $(n-1)$-sphere.

Problem 5.6

Show that the Klein bottle does not embed in $\mathbb{R}^3$.