Differential topology, **Yu Zhao**

Homework Solutions

We consider the map ϕ from $U = \{x \in \mathbb{R}^n | = 0 < |X| < 2\}$ to S^{n-1} by $\phi(x) = x/|x|$. Then ϕ is a restriction map. And consider $\phi + c$ for c small enough. Then the fixed point of $\phi + c$ is $c\lambda$ for one $\lambda > 1$ and another $0 > \lambda > -1$. For $\lambda > 1$ The map $1 - T\phi$ has positive eigenvalue on the perpendicular directions and have positive eigenvalue along the line generates by c too. Hence it's sign of determinant is 1. For the negative λ, we have all eigenvalues along the perpendicular direction are negative and still positive along c. Thus the lefeschetz number is $(-1)^{n-1} + 1$, which is 0 for n even, and 2 for n odd.