

Homework number 7

Do both exercises.

Exercise 16. With all details prove the exactness of the long exact sequence of the homotopy groups for a couple (X, A) in one of the terms $\pi_n(A, x_o)$ and $\pi_n(X, A, x_o)$.

Exercise 17. For $1 \leq k < n$ we have a canonical inclusion $\mathbb{R}P^k \hookrightarrow \mathbb{R}P^n$. Using the cup product in cohomology of real projective spaces with \mathbb{Z}_2 coefficients prove that $\mathbb{R}P^k$ is not a retract of $\mathbb{R}P^n$.