Homework 3

February 19, 2019

(i) Show that, if G is an H-space, with $e \in G$ the base point serving as the homotopy unit element, then the action of $\pi_1(G, e)$ on $\pi_n(G, e)$ is always trivial, so that G is a *simple space*.

(ii) Show that if A is contractible to a point within X, then: (i) j_* is an injection. (ii) ∂ is a surjection. (iii) i_* is the zero morphism. Moreover, $\pi_n(X, A) \cong \pi_n(X) \oplus \pi_{n-1}(A)$.

(iii) Exercises 3, 5, 15, 17 of Hatcher, Section 4.1.