MA3408 Week 2

Drew Heard (drew.k.heard@ntnu.no)

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1. Question 1

Compute $\pi_i(S^n)$ for $i < n$ using the cellular approximation theorem.

2. Question 2 (cofibrations)

(a) Suppose $\{(X_i, A_i)\}$ are a collection of spaces satisfying HEP, then so does $\{(\coprod X_i, \coprod A_i)\}$.

(b) Suppose (X, A) satisfies HEP, and $f\colon A \to B$ is a continuous map. Let $Y = X \cup_f B$ be the pushout, then (Y, B) satisfies the HEP.

(c) Suppose $A = X_0 \subseteq X_1 \subseteq \cdots \subseteq X_n \subseteq X_{n+1} \subseteq \cdots$.
Let $X = \operatorname{colim} X_i$. If each (X_i, X_{i-1}) satisfies HEP, then so does (X, A).

3. Question 3 (fibrations)

Show that the composition of fibrations is a fibration.