

Theorem 2.10. If two maps $f, g: X \rightarrow Y$ are homotopic, then they induce the same homomorphism $f_* = g_*: H_n(X) \rightarrow H_n(Y)$.

$$\begin{array}{ccccccc}
 \cdots & \longrightarrow & C_{n+1}(X) & \xrightarrow{\partial} & C_n(X) & \xrightarrow{\partial} & C_{n-1}(X) \longrightarrow \cdots \\
 & & \downarrow f_{\#} & & \downarrow f_{\#} \downarrow g_{\#} & \nearrow p & \downarrow f_{\#} \downarrow g_{\#} \\
 \cdots & \longrightarrow & C_{n+1}(Y) & \xrightarrow{\partial} & C_n(Y) & \xrightarrow{\partial} & C_{n-1}(Y) \longrightarrow \cdots
 \end{array}$$

