

$$\begin{array}{ccccc}
 & & H_n(U_i, U_i \setminus \{x_i\}) & \xrightarrow{f_*} & H_n(V, V \setminus \{y\}) \\
 & \swarrow \parallel & \downarrow k_i & & \downarrow \parallel \\
 H_n(S^n, S^n \setminus \{x_i\}) & \xleftarrow{p_i} & H_n(S^n, S^n \setminus \{f^{-1}(y)\}) & \xrightarrow{f_*} & H_n(S^n, S^n \setminus \{y\}) \\
 & \nwarrow \parallel & \uparrow j & & \uparrow \parallel \\
 & & H_n(S^n) & \xrightarrow{f_*} & H_n(S^n)
 \end{array}$$