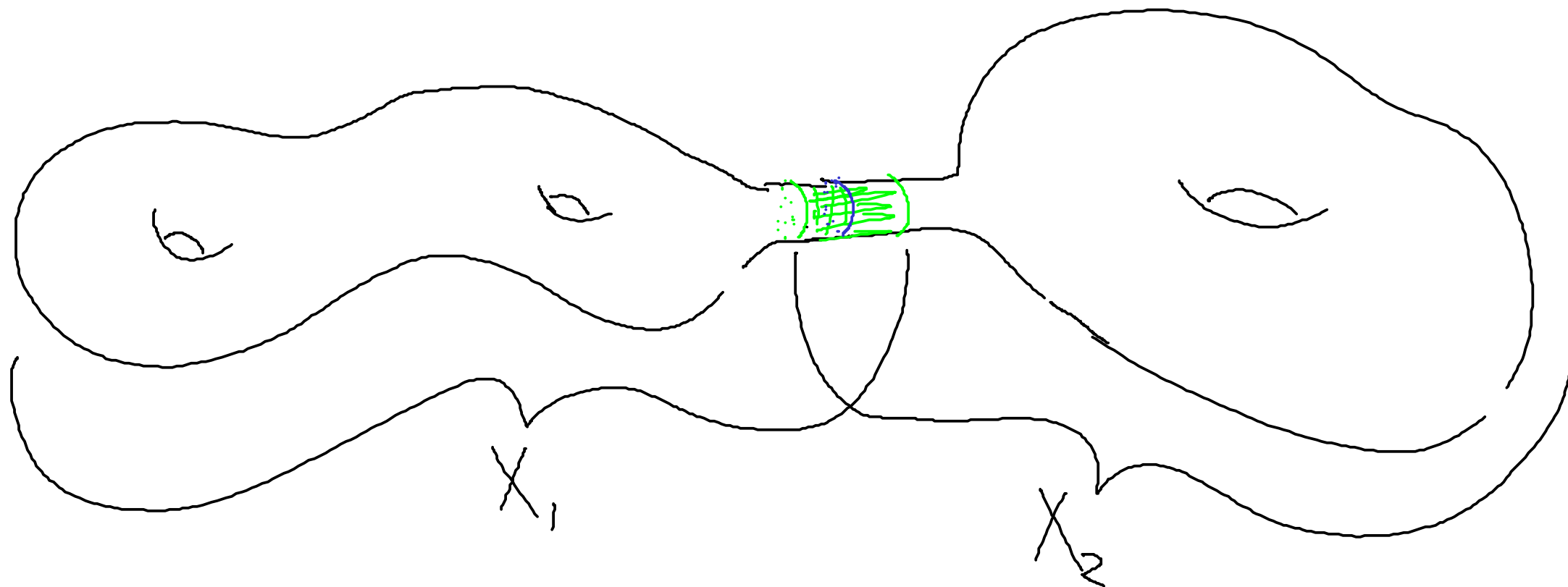
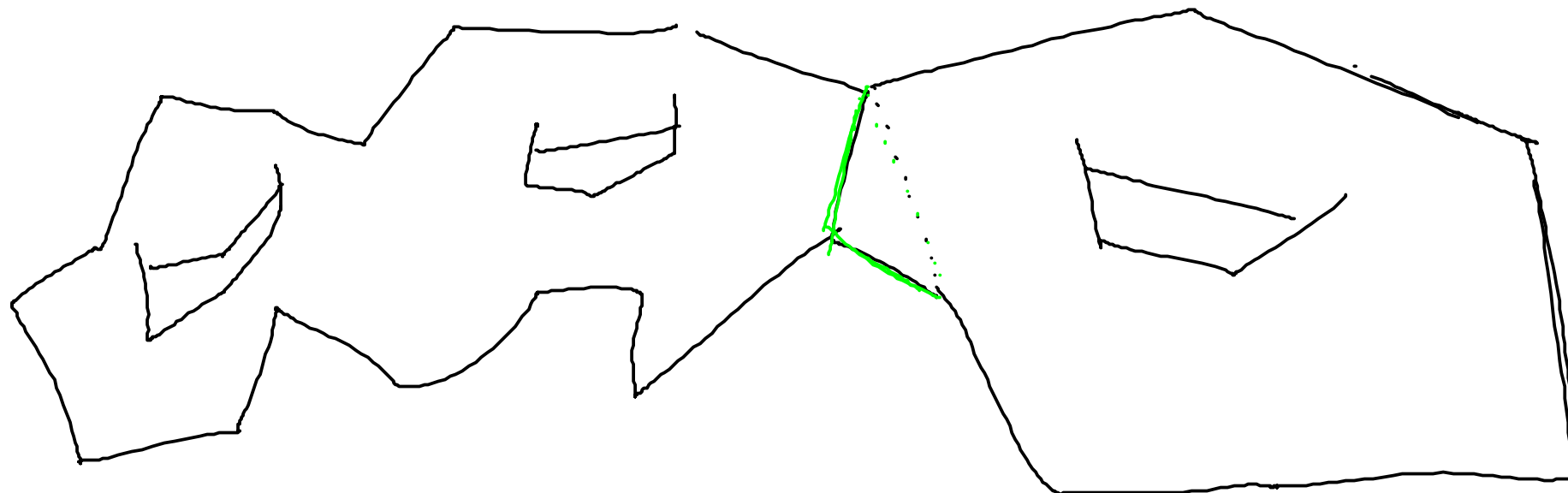
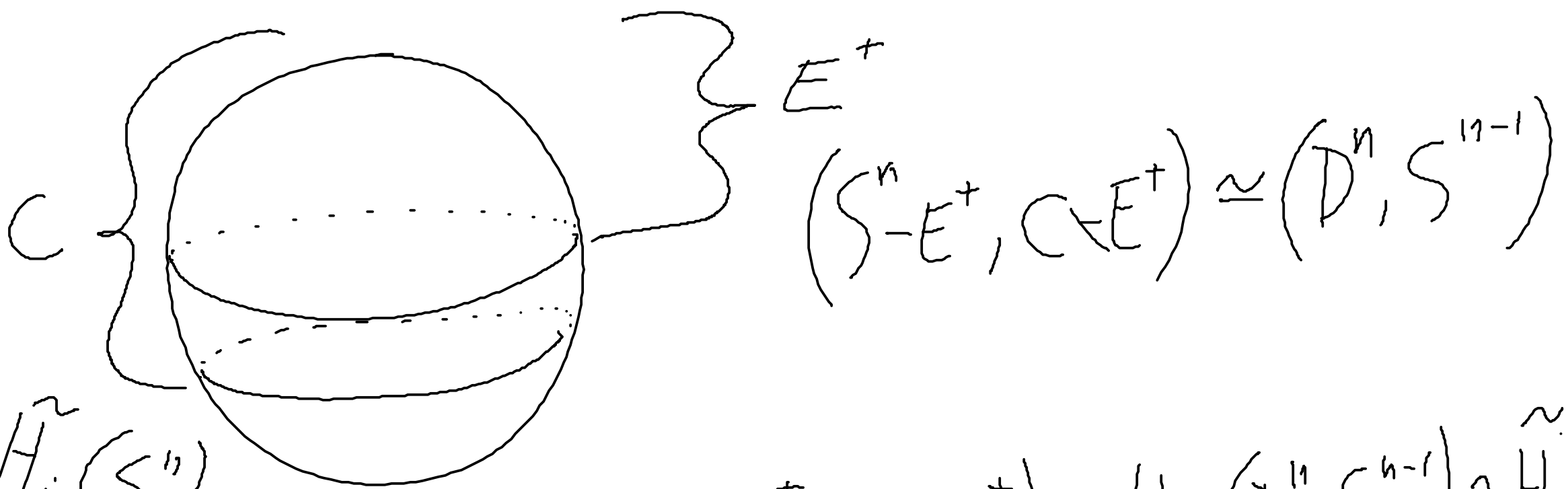


$$\begin{array}{ccccccccc}
 \rightarrow & H(A) & \longrightarrow & H(X) & \longrightarrow & H_k(X,A) & \longrightarrow & H_{k-1}(A) & \longrightarrow & H_{k-1}(X) & \longrightarrow \\
 & \downarrow \gamma_k & & \downarrow \gamma_k & & \downarrow f_* & & \downarrow f_* & & \downarrow f_* & \\
 & H_k(B) & \longrightarrow & H_k(X) & \longrightarrow & H_k(X,B) & \longrightarrow & H_{k-1}(B) & \longrightarrow & H_{k-1}(X) & \longrightarrow
 \end{array}$$

$$\begin{array}{ccc}
 S^{n-1} & \xrightarrow{\quad} & D^n \xrightarrow{\quad} S^{n-1} \\
 & \searrow & \nearrow \\
 H_{n-1}(S^{n-1}) \cong \mathbb{Z} & \xrightarrow{\quad} & H_{n-1}(D^n) \xrightarrow{\quad} H_{n-1}(S^{n-1}) \cong \mathbb{Z} \\
 & \searrow & \nearrow \\
 & & \mathbb{Z}
 \end{array}$$

$\downarrow \cong$
 $\downarrow \cong$





E^+

$$(S^n - E^+, C - E^+) \cong (D^n, S^{n-1})$$

$\tilde{H}_i(S^n)$

$$H_i(S^n, \mathbb{C}) \cong H_i(S^n - E^+, C - E^+) \cong H_i(D^n, S^{n-1}) \cong \tilde{H}_{i-1}(S^{n-1})$$

$$\tilde{H}_i(S^{n-1}) \rightarrow \tilde{H}_i(D^n) \rightarrow H_i(D^n, S^{n-1}) \rightarrow \tilde{H}_{i-1}(S^{n-1}) \rightarrow \tilde{H}_{i-1}(D^n)$$