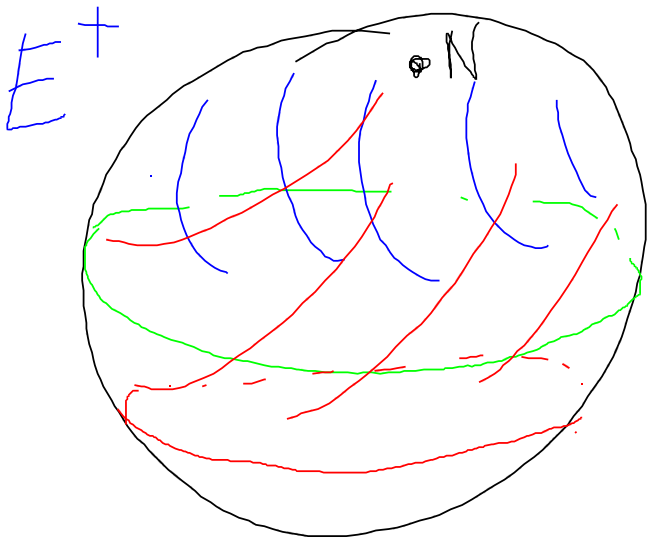
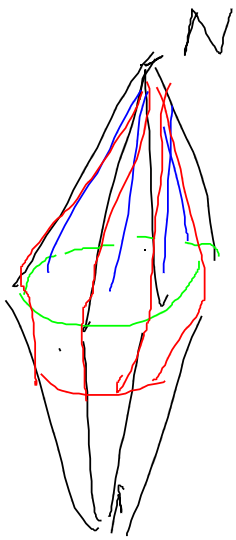




$\overline{E^+}$ c int Capr

Capr è contrattile

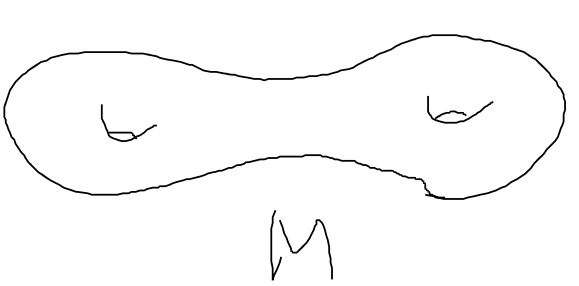
Capr $- E^+$ ammette S^{n-1} come retratto forte per deformazione

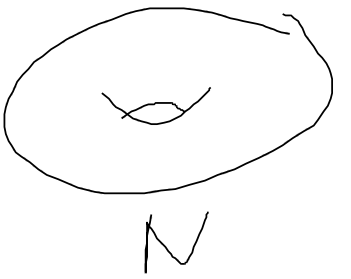
$$\begin{array}{ccc} (S^n - E^+, Capr - E^+) & \hookrightarrow & (S^n, Capr) \\ \wr & & \wr \\ (D^n, S^{n-1}) & & (S^n, N) \end{array}$$

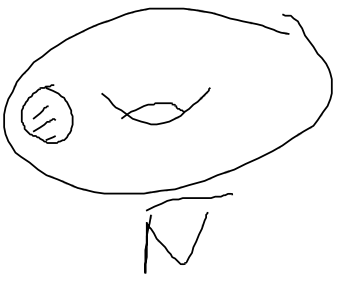
$$\tilde{H}_k(S^n) \cong H_k(S^n, Capr) \cong H_k(S^n - E^+, Capr - E^+) \cong$$

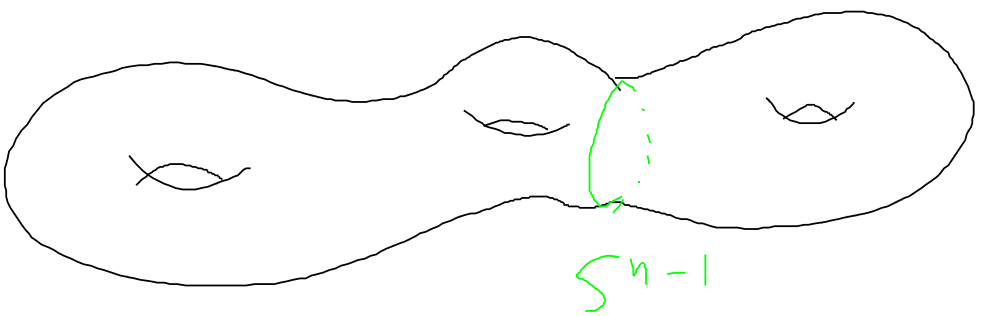
$$\cong H_k(D^n, S^{n-1}) \cong \tilde{H}_{k-1}(S^{n-1})$$

$$\to \underbrace{\tilde{H}_k(D^n)}_{0} \to H_k(D^n, S^{n-1}) \xrightarrow{\cong} \tilde{H}_{k-1}(S^{n-1}) \to \underbrace{\tilde{H}_{k-1}(D^n)}_{0} \to$$

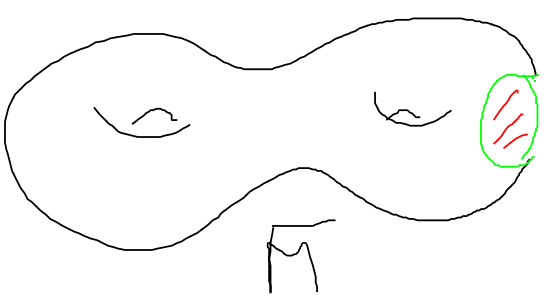








$M \# N$



D^n

S^{n-1}

$$\overline{M} \cap D^n = S^{n-1} \qquad \overline{M} \cup D^n = M$$

$$k \leq n-2$$

$$\tilde{H}_k(S^{n-1}) \to \tilde{H}_k(\bar{M}) \oplus \tilde{H}_k(D^n) \to \tilde{H}_k(M) \to \tilde{H}_{k-1}(S^{n-1})$$

0 $\cong$ 0

$$\tilde{H}_k(\bar{M}) \cong \tilde{H}_k(M)$$

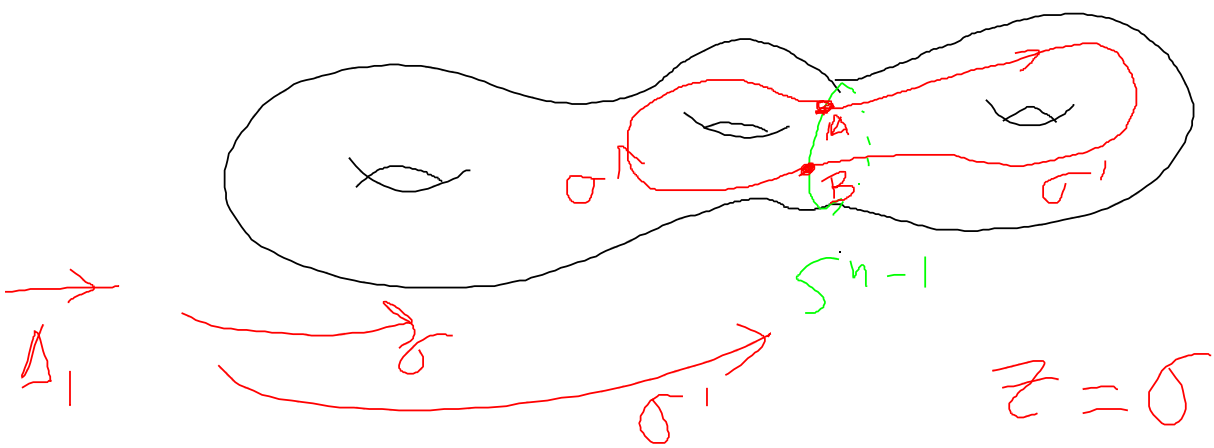
$\bar{M} \cap \bar{N} = S^{n-1}$ $\quad \bar{M} \cup \bar{N} \simeq M \# N$

$k \leq n-2$

$$\tilde{H}_k(S^{n-1}) \to \tilde{H}_k(\bar{M}) \oplus \tilde{H}_k(\bar{N}) \to \tilde{H}_k(\bar{M} \cup \bar{N}) \to \tilde{H}_{k-1}(S^{n-1})$$

0 $\cong$ 0

$$\tilde{H}_k(M) \oplus \tilde{H}_k(N) \cong \tilde{H}_k(M \# N)$$



$$(\sigma, \sigma') \longmapsto z$$

$$S_k(\bar{M}) \oplus S_k(\bar{N}) \longrightarrow S_k(M \# N)$$

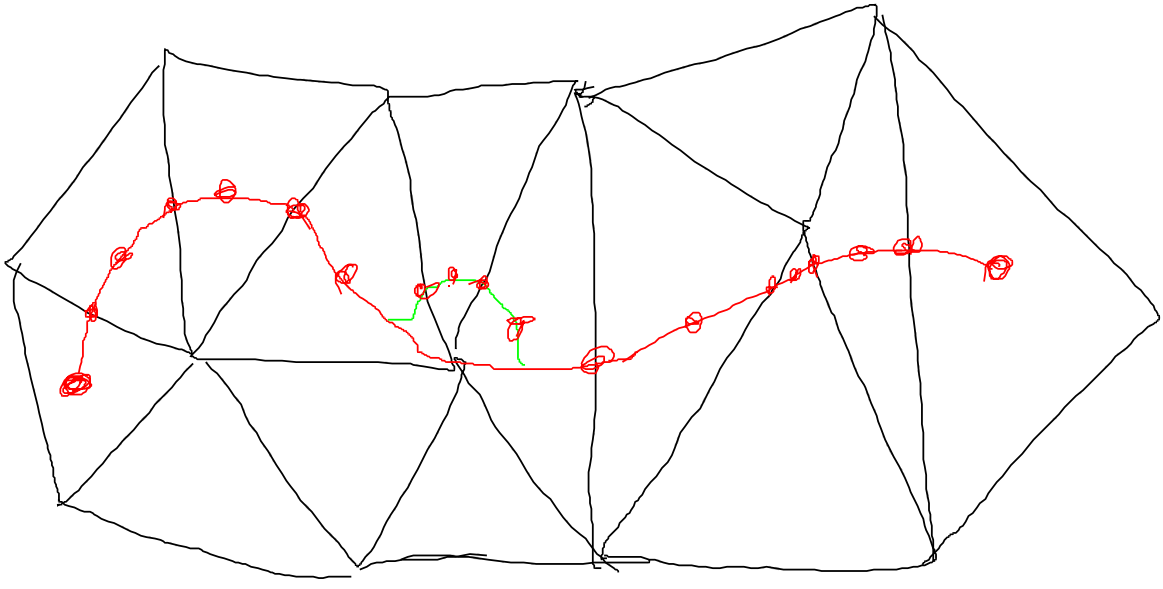
$$\downarrow \partial \oplus \partial$$

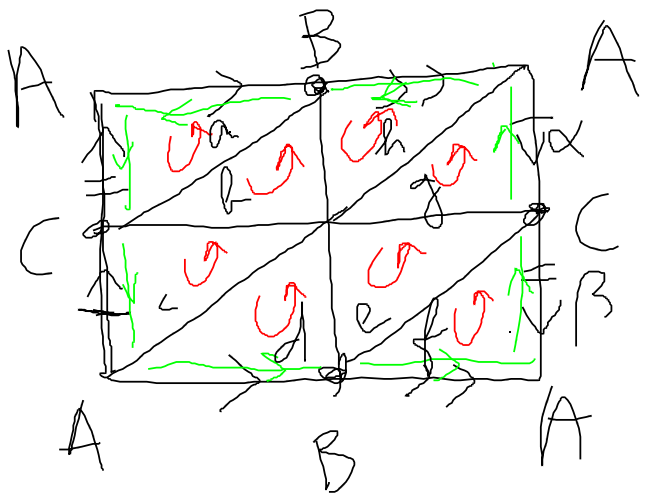
$$S_{k-1}(S^{n-1}) \longrightarrow S_{k-1}(\bar{M}) \oplus S_{k-1}(\bar{N})$$

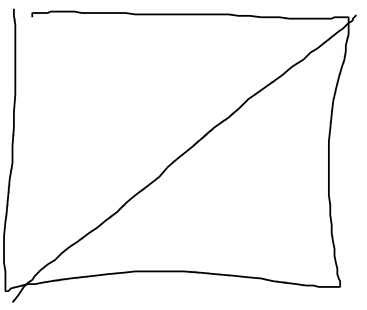
$$(\partial\sigma, \partial\sigma')$$

$$\| $$

$$A = B \longmapsto (A - B, B - A)$$



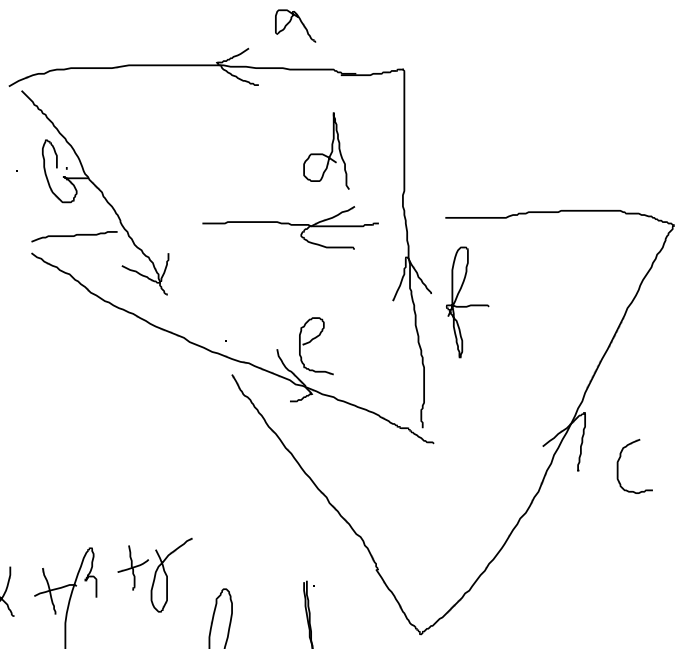




$$\partial(a+b+c+d+e+f+g+h) =$$

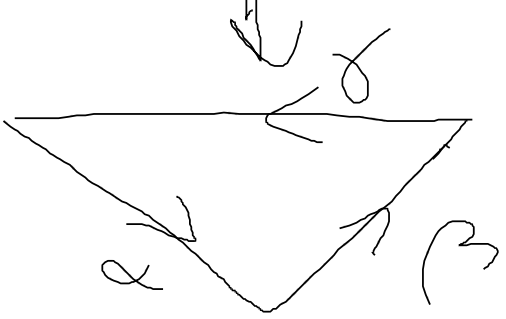
$$2(\alpha+\beta) \neq 0$$

$$\partial(0\cdot(a+\dots+h)) = 0$$



$$\xi = a+b+c+d+e+f$$

$$\eta = \alpha+\beta+\gamma$$



$$a \longmapsto \gamma$$
$$b \longmapsto \alpha$$
$$c \longmapsto \beta$$
$$d \longmapsto$$
$$e \longmapsto \alpha$$
$$f \longmapsto \beta$$

$$h_*(\{\xi\}) = h_*(\{a+b+c+d+e+f\}) =$$

$$= \{h(a+b+c+d+e+f)\} =$$

$$= \{\gamma+\alpha+\beta+\gamma+\alpha+\beta\} = 2\{\xi\}$$