

X_1

X_2

X_3

$X_1 - X_2$

$X_1 - X_3$

$$X_2 - X_3 = X_1 - X_3 - (X_1 - X_2)$$

$$\sigma_k \cdot \Delta^k \rightarrow \{P\}$$

$Z_4 = 0 = B_4$

$$\partial(\sigma_4) = \sigma_3 - \sigma_3 + \sigma_3 - \sigma_3 + \sigma_3 = \sigma_3$$

$Z_3 = 0 = B_3$

$$\partial(\sigma_3) = \sigma_2 - \sigma_2 + \sigma_2 - \sigma_2 = 0$$

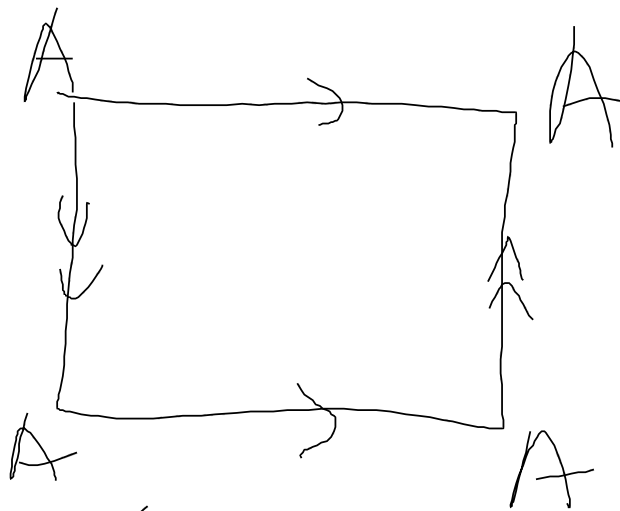
$Z_2 = 0 = B_2$

$$\partial(\sigma_2) = \sigma_1 - \sigma_1 + \sigma_1 = \sigma_1$$

$$\partial(\sigma_1) = \sigma_1 F_0^0 - \sigma_1 F_1^0 = \sigma_0 - \sigma_0 = 0$$

$Z_1 = 0 = B_1$

$$\begin{aligned}
 \langle v^0 v^1 \hat{v}^2 v^3 \rangle &= \\
 &= \langle v^0 v^1 v^3 \rangle = \\
 &= \langle v^1 v^3 v^0 \rangle = \\
 &= \langle v^3 v^0 v^1 \rangle
 \end{aligned}$$



$$\begin{aligned}
 \pi_1(\text{Klein}, A) &\cong \langle a, b \mid ab = a^{-1}b \rangle \\
 &\cong \langle c, d \mid c^2 = d^2 \rangle
 \end{aligned}$$

$$H_1(\text{Klein}^n) \cong \mathbb{Z} \oplus \mathbb{Z}_2$$

$$\begin{aligned}\beta_0 &= \alpha^0 - \gamma_0 - \gamma_{-1} = \\ &= 3 - 2 - 0 = 1\end{aligned}$$

$$\begin{pmatrix} 1 \\ 1 \\ -1 \end{pmatrix} \rightsquigarrow \begin{pmatrix} 1 \\ 0 \\ 0 \end{pmatrix} \begin{array}{l} \text{II} - \text{I} \\ \text{III} + \text{I} \end{array}$$

$$\begin{aligned}\beta_1 &= \alpha^1 - \gamma_1 - \gamma_0 = \\ &= 3 - 1 - 2 = 0\end{aligned}$$

$$\begin{aligned}\beta_2 &= \alpha^2 - \gamma_2 - \gamma_1 = \\ &= 1 - 0 - 1 = 0\end{aligned}$$

$$H_0 \cong \mathbb{Z} \quad H_1 = 0 \quad H_2 = 0$$