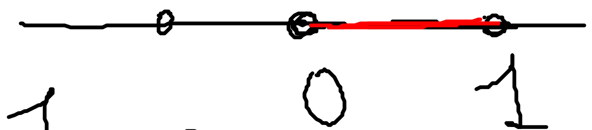
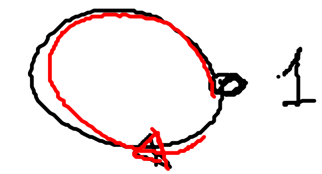
$1 \leftsquigarrow p : (\mathbb{R}, 0) \longrightarrow (S^1, 1) \qquad \pi_1(\mathbb{R}) = 1$

$\langle \gamma^n \rangle \cong n\mathbb{Z} \qquad x \longmapsto e^{ix}$

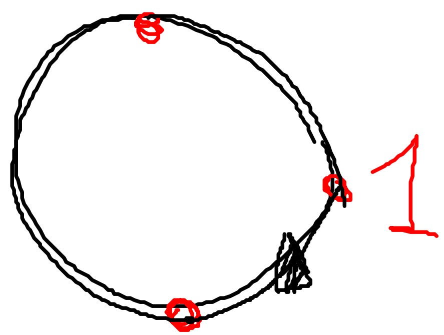


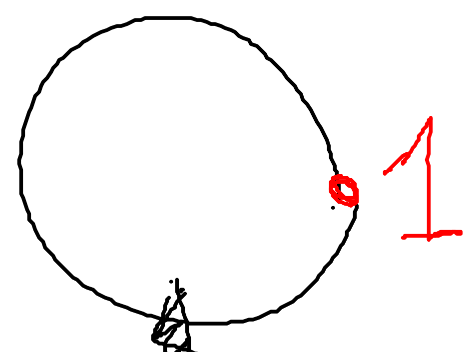


$n \geq 1 \qquad p_n : (S^1, 1) \longrightarrow (S^1, 1) \qquad \mathbb{Z} \cong \pi_1(S^1, 1) \cong \langle \gamma \rangle$

$z \longmapsto z^n$

$n = 3$

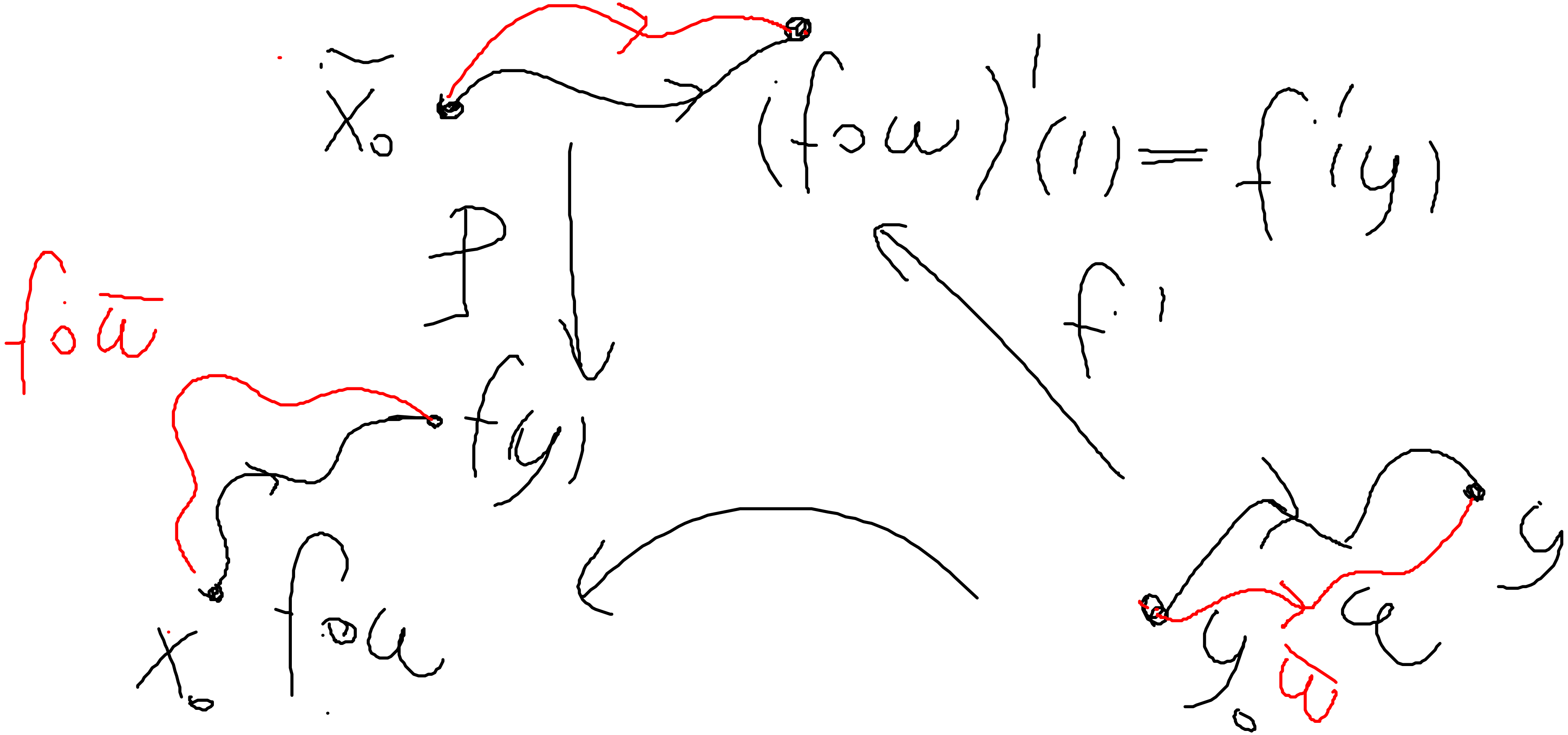




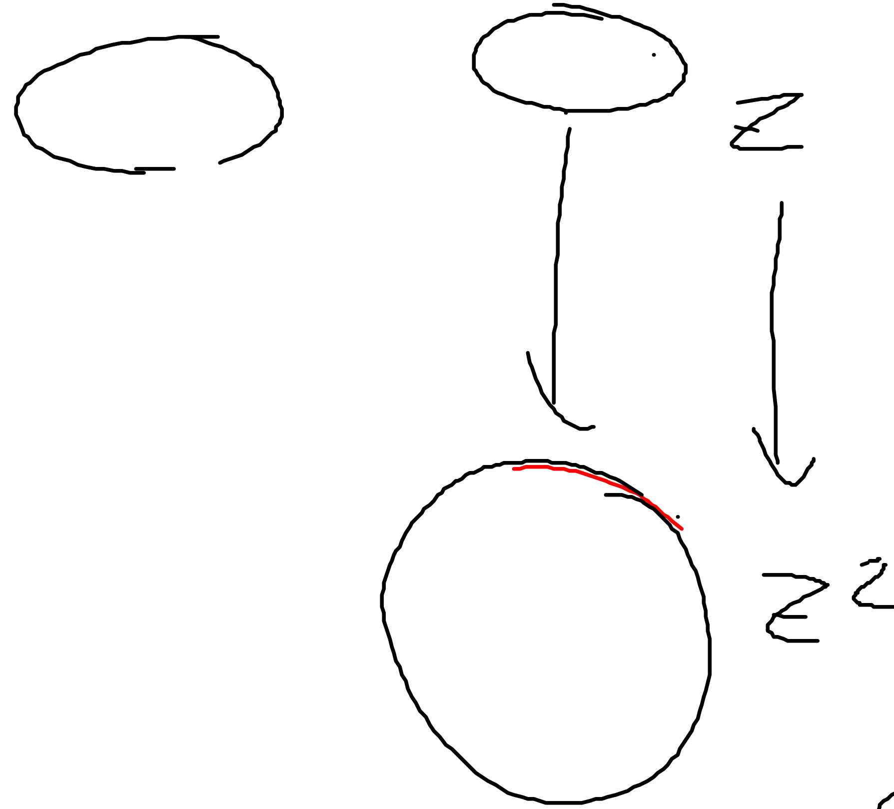
$\pi_1(S^1, 1) \langle \gamma^3 \rangle$

$$f_\#(\pi_1(Y, y_0)) \subseteq p_\#(\pi_1(\tilde{X}, \tilde{x}_0))$$

$$\begin{tikzcd}
 & \pi_1(\tilde{X}, \tilde{x}_0) \arrow[d, "p_\#"'] \\
 & \pi_1(X, x_0) & \pi_1(Y, y_0) \arrow[l, "f_\#"] \arrow[ul, bend right, "f'_\#"'] \arrow[l, phantom, shift left=6, "\equiv"]
\end{tikzcd}$$



$\tilde{X}_0$
$(f\circ w)'(1) = f'(y)$
p
f'
$f\circ\bar{w}$
$f(y)$
X_0
$f\circ w$
Y_0
w
$\bar{w}$
y

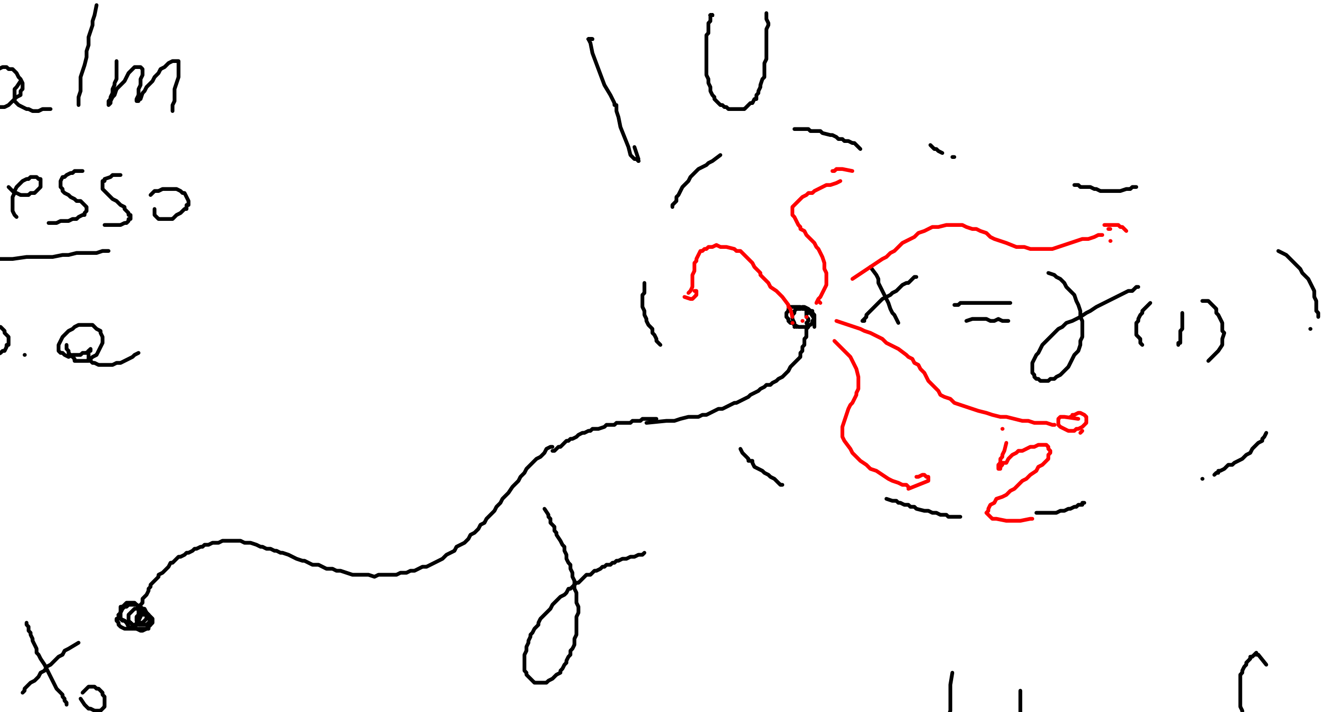


$2\mathbb{Z}$

$$p_\#: \pi_1(\tilde{X}, \tilde{x}_0) \to \pi_1(X, x_0)$$

U semilocalm 1-connesso

localm. c.p.a



$$P_H : P(X,x_0)/\sim_H \longrightarrow X$$

$$[\gamma] \longmapsto \gamma(1)$$

S^1

$3\mathbb{Z} = H$

$$U_{[\gamma]} = \{ [\gamma\eta] : \eta(I) \subseteq U,\ \eta(0) = \gamma(1) \}$$

base di aperti della topologia

X l.c.p.a + connesso + s.l. 1-c.

COSTRUZIONE TH.

$$\left\{ H \leq \pi_1(X, x_0) \right\} \xleftrightarrow[\text{su}]{1-1} \left\{ \begin{array}{l} \text{classi di equivalenza} \\ \text{di rivestimenti} \\ \text{c.p.a. puntati di} \\ (X, x_0) \end{array} \right\}$$

$$\xleftarrow{\quad p_\# \quad}$$

$$\left\{ \begin{array}{l} \cdot \ \tilde{x}_2 \\ \cdot \\ \cdot \ \tilde{x}_1 \\ \cdot \\ \cdot \ \cancel{\tilde{x}}_0 \end{array} \right.$$

UNICITA' (THM 1)

$$P_{1\#}(\pi_1(\hat{X}_2, \hat{x}_2)) = H \stackrel{(*)}{=} P_{2\#}(\pi_1(\hat{X}_1, \hat{x}_1))$$

$$\begin{tikzcd}
(\hat{X}_2, \hat{x}_2) \arrow[rr, dashed, shift right, "g"'] \arrow[dr, "P_1"'] & & (\hat{X}_1, \hat{x}_1) \arrow[ll, shift right, "f"'] \arrow[dl, "P_2"] \\
& (X, x_0) &
\end{tikzcd}$$

(*) TH ESIS. di sollev. di P_2 rispetto a P_1

(*) + TH. ESIST. del SOLL. di P_1 risp. a P_2

TH. UNICITA' DEL SOLL.

$f \circ g = id$

$g \circ f = id$

SE DIMENTICO IL P.TO BASE SOPRA OTTENGO

$$\left\{ \begin{array}{l} \text{classi di} \\ \text{coniugio} \\ \text{di } H \leq \pi_1(X, x_0) \end{array} \right\} \longleftrightarrow \left\{ \begin{array}{l} \text{classi di equiv.} \\ \text{di rivestimenti} \\ \text{c.p.a. di } X \end{array} \right\}$$