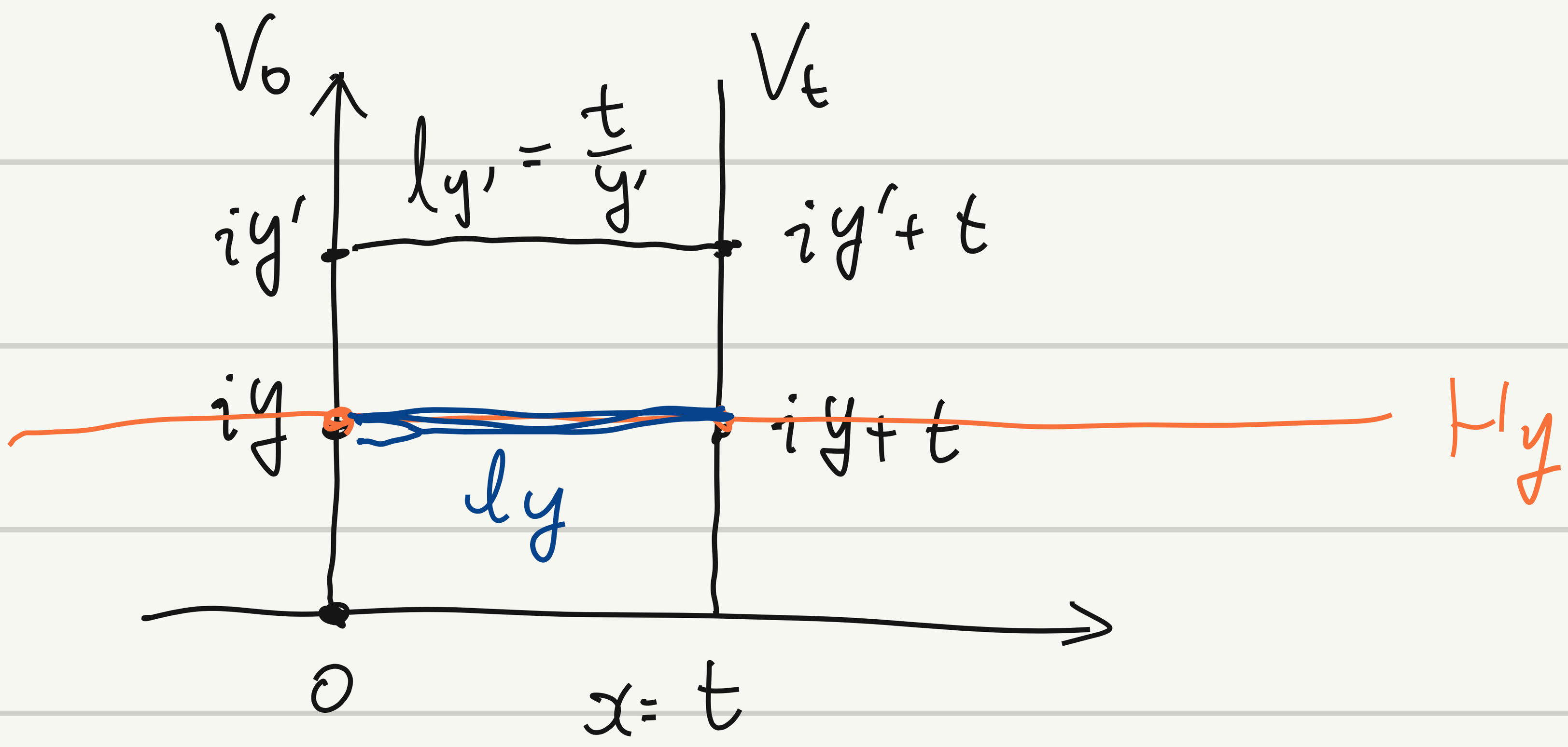
2:

$T_t : \mathbb{H} \longrightarrow \mathbb{H}$

$z \longmapsto z + t$



a) $x = t$

b) $l_y = l_{\mathbb{H}}(\gamma) = \int_0^t \frac{1}{y}\, dt = \frac{t}{y}$.

$\gamma : [0, t] \longmapsto \mathbb{H}$

$s \longmapsto iy + s$

$\dot{\gamma}(s) = (1, 0)$

$\|\dot{\gamma}(s)\|_{\mathbb{H}} = \dfrac{\|\dot{\gamma}(s)\|_E}{\operatorname{Im}\gamma(s)} = \dfrac{1}{y}$

c) $\lim_{y \to +\infty} l_y = \lim_{y \to +\infty} \dfrac{\overset{=cst}{t}}{y} = 0$

$\underline{l(f)} := \underline{\inf\{d_{\mathbb{H}}(z, f(z))} \mid z \in \mathbb{H}\}$

$z \in \mathbb{H}$ realizes $l(f)$

if $d_{\mathbb{H}}(z, f(z)) = l(f)$

d) $d_{\mathbb{H}}(iy, T_t(iy)) < \frac{t}{y} \xrightarrow[y \to +\infty]{} 0$

$\Rightarrow \inf\{d_{\mathbb{H}}(z, T_t(z)) \mid z \in \mathbb{H}\}$

$\leq \inf\{d_{\mathbb{H}}(iy, T_t(iy)) \mid y \in \mathbb{R}\}$

$\underline{= 0}$

$\Rightarrow l(T_t) = 0$

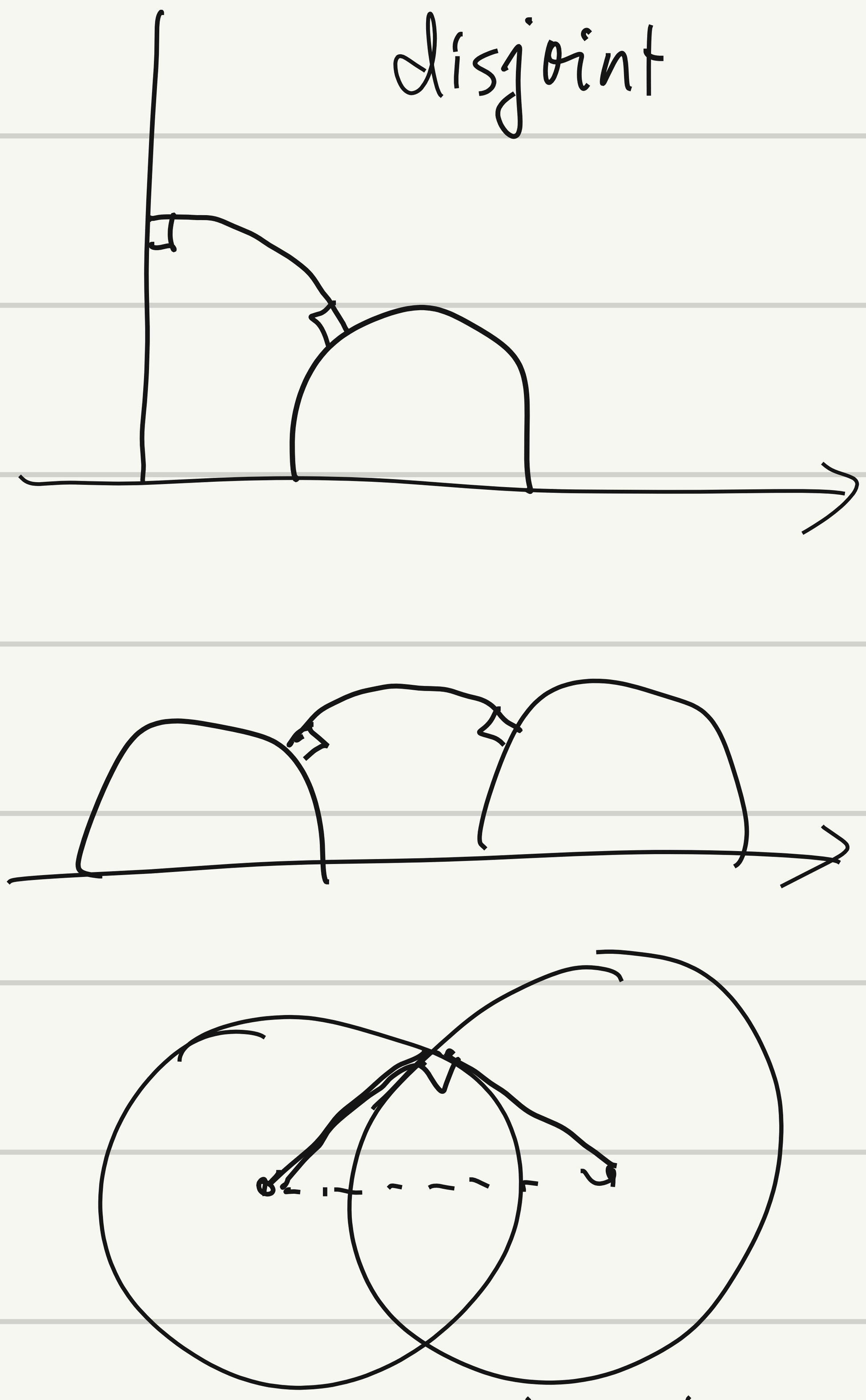
$\forall z \quad T_t(z) = \underline{z + t} \neq z$

$\Rightarrow d_{\mathbb{H}}(z, T_t(z)) > 0$

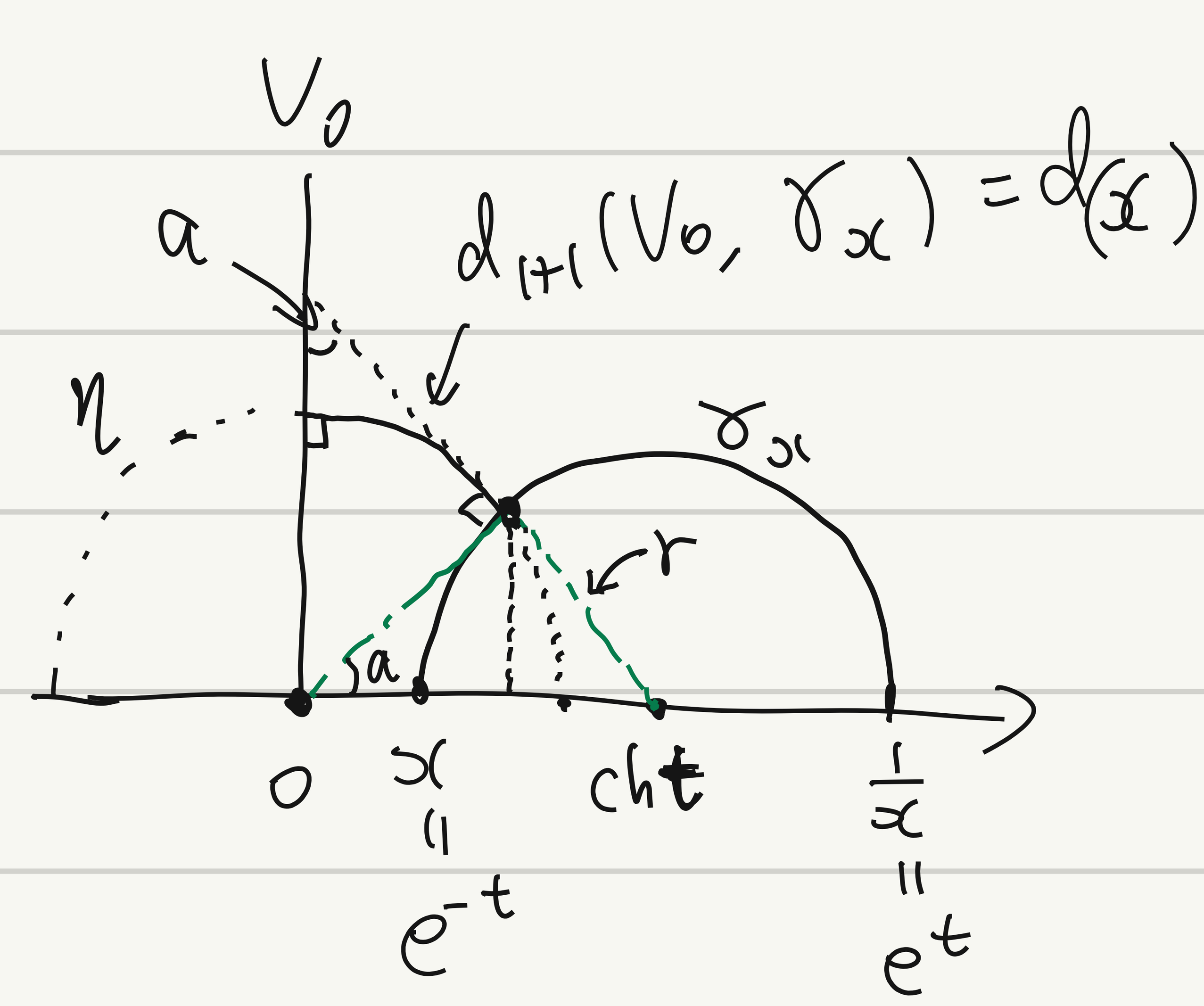
$\Rightarrow \nexists z$ realize $l(T_t)$.

1. 3).

disjoint



$\log tg \frac{b}{2} - \log tg \frac{a}{2}$



$x = e^{-t}$

$r = \dfrac{\frac{1}{x} - x}{2}$

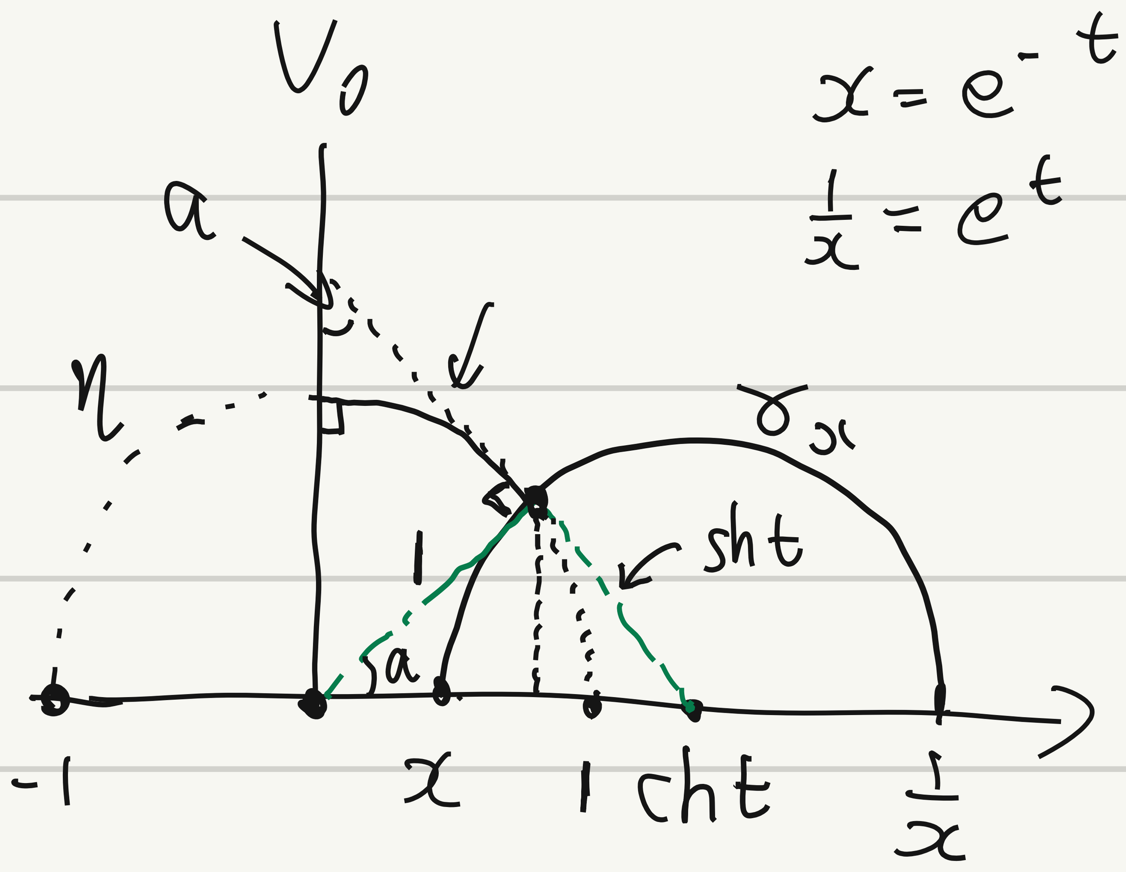
$= sh t$.

$\eta \perp V_0 \Rightarrow$ Euclidean center of $\eta = 0$

$\gamma_x \perp \eta \Rightarrow$

$d_x = \log tg \frac{\pi/2}{2} - \log tg \frac{a}{2}$

$= \log \dfrac{\cos a + 1}{\sin a}$



$x = e^{-t}$

$\frac{1}{x} = e^{t}$

$$\sin a = \frac{\operatorname{sh} t}{\operatorname{ch} t} = \tanh t = \frac{\frac{1}{x} - x}{\frac{1}{x} + x} = \frac{1-x^2}{1+x^2}$$

$$\cos a = \frac{1}{\operatorname{ch} t} = \frac{1}{\frac{1}{x} + x} = \frac{x}{1+x^2}$$

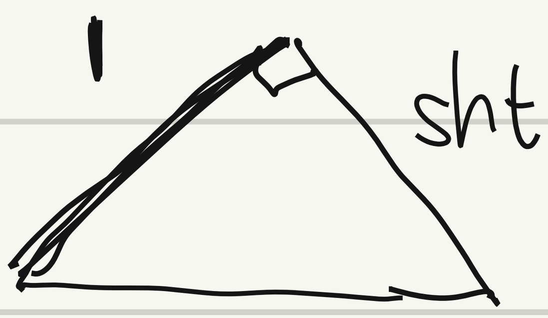
$$\underline{d(x)} = \log \frac{\cos a + 1}{\sin a} = \log \frac{\frac{x}{1+x^2} + 1}{\frac{1-x^2}{1+x^2}}$$

$$= \log \frac{1+x+x^2}{1-x^2}$$

$$= \log \frac{1 + \operatorname{ch} t}{\operatorname{sh} t}$$

$$= \log \frac{\operatorname{ch} \frac{t}{2}}{\operatorname{sh} \frac{t}{2}}$$

$$\underline{= \log \coth \frac{t}{2}}$$



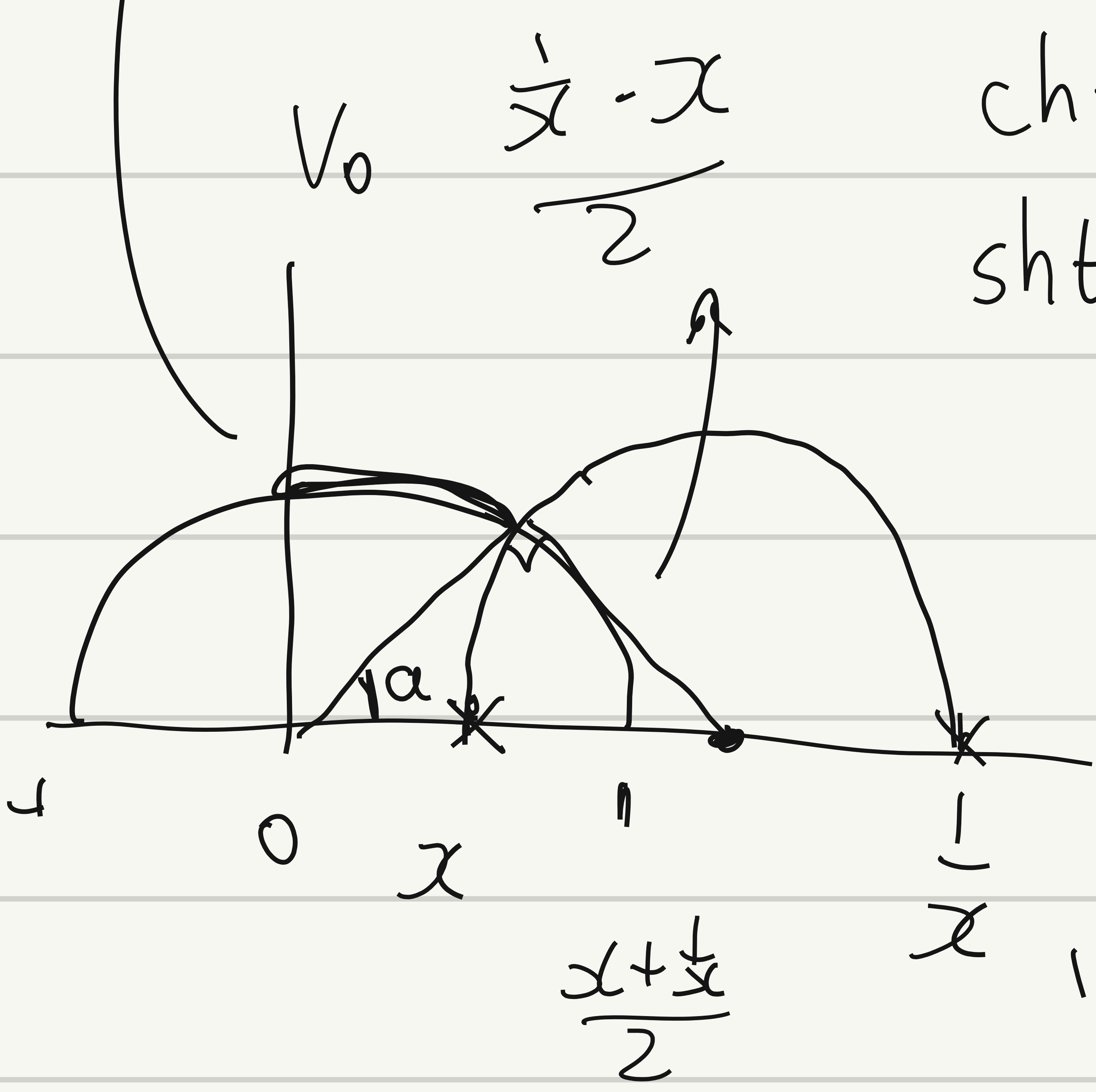
$\operatorname{sh} t = \frac{\frac{1}{x} - x}{2}$

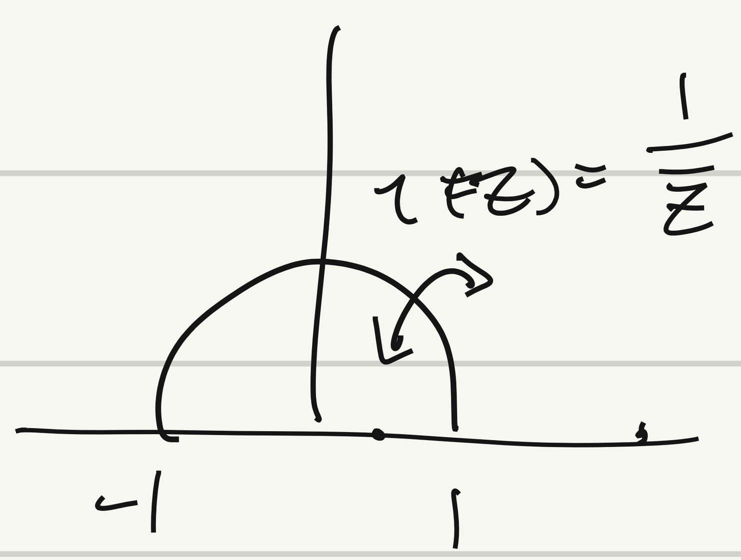
$\operatorname{ch} t = \frac{\frac{1}{x} + x}{2}$

$$\operatorname{ch}^2 t - \operatorname{sh}^2 t = 1$$

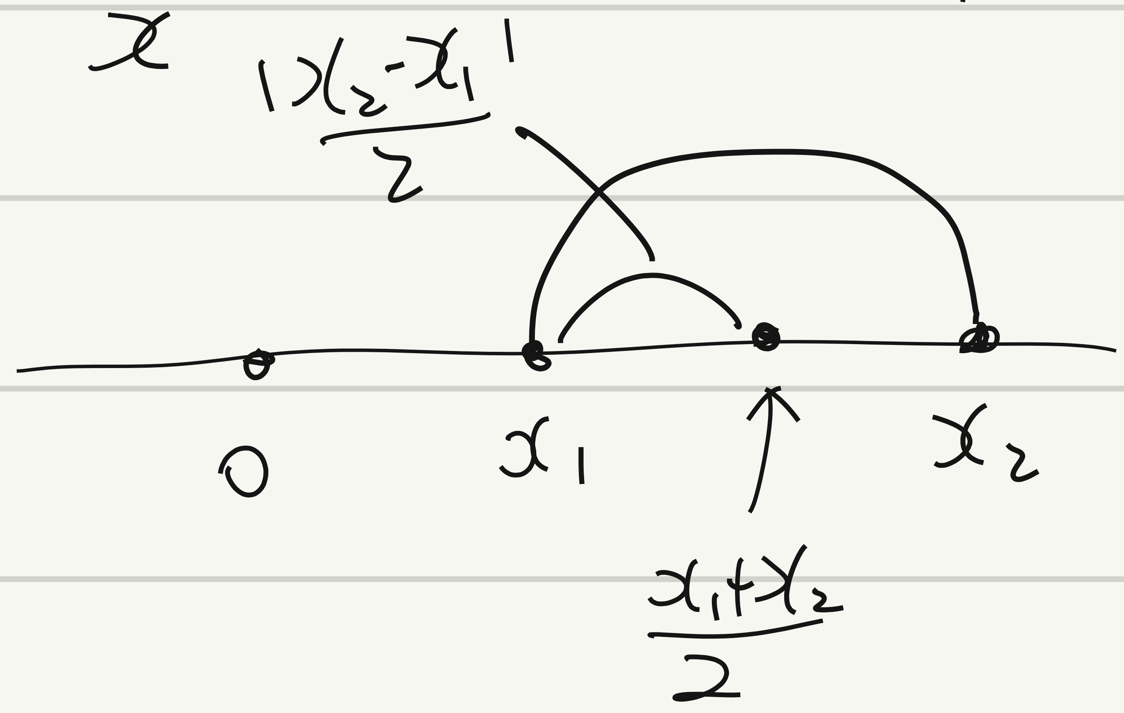
$$\operatorname{ch} t = 2\operatorname{ch}^2 \frac{t}{2} - 1$$

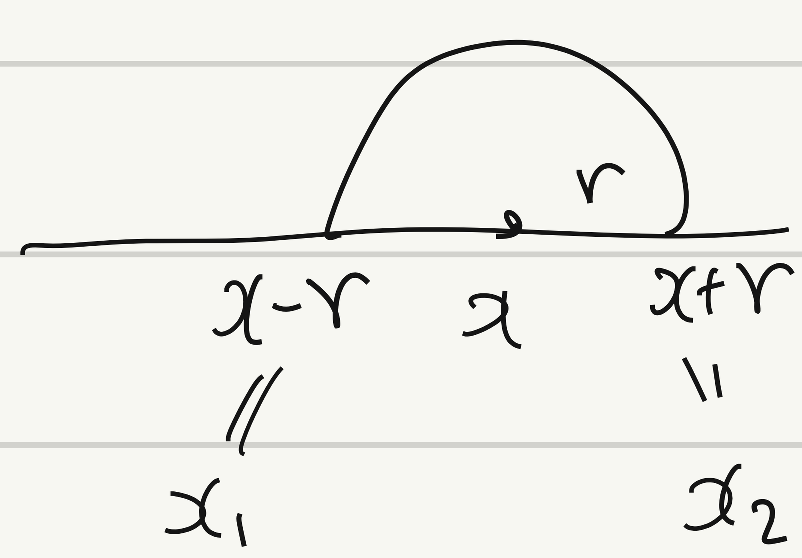
$$\operatorname{sh} t = 2 \operatorname{ch} \frac{t}{2} \operatorname{sh} \frac{t}{2}$$

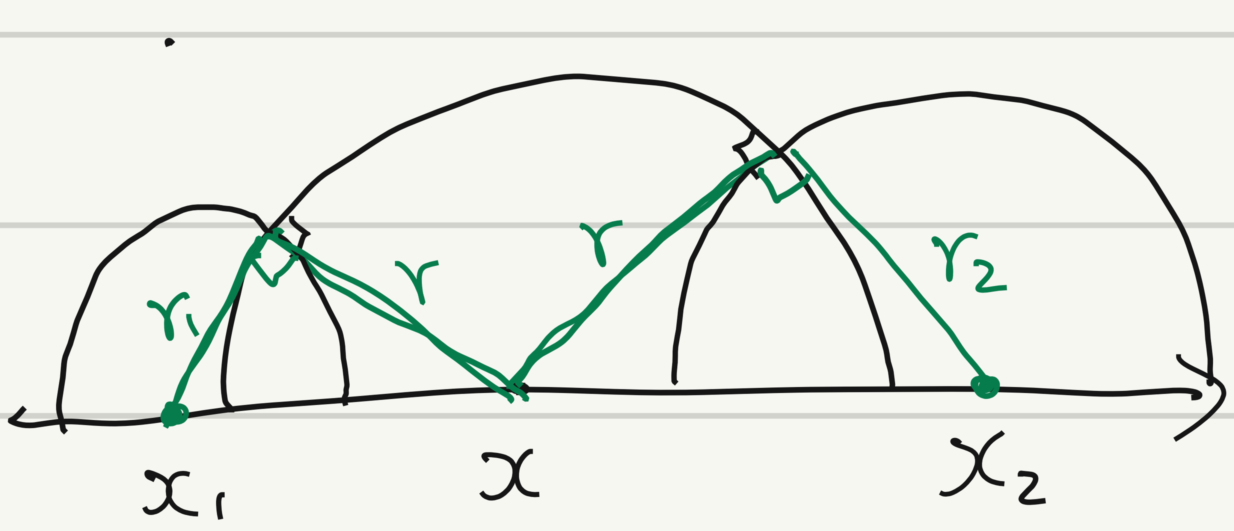




$\tau(x) = \frac{1}{x}$







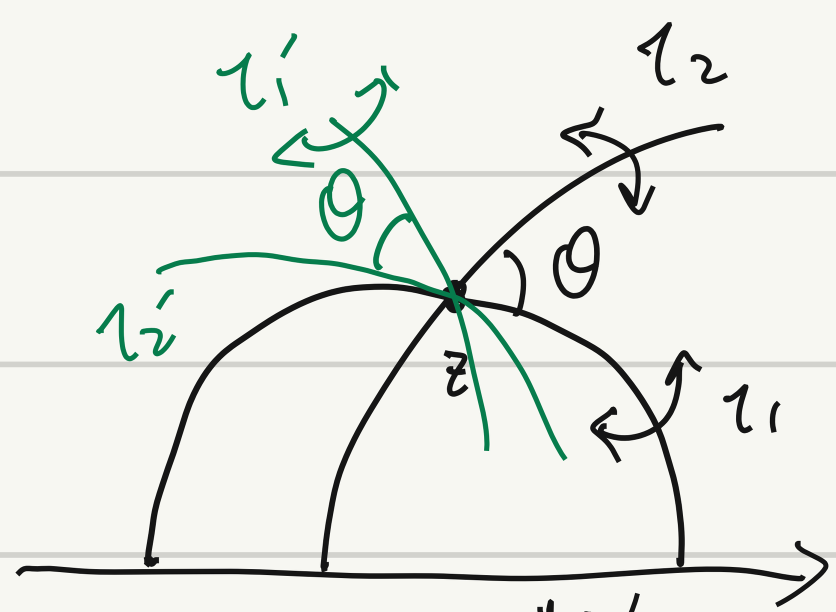
$x \quad r$ unknowns $\begin{cases} (x-x_1)^2 = r^2 + r_1^2 \\ (x-x_2)^2 = r^2 + r_2^2 \end{cases}$

$$(x-x_1)^2 - (x-x_2)^2 = r_1^2 - r_2^2$$

$$(x_2-x_1)(2x-x_1-x_2) = r_1^2 - r_2^2$$

$$2x - x_1 - x_2 = \frac{r_1^2 - r_2^2}{x_2 - x_1}$$

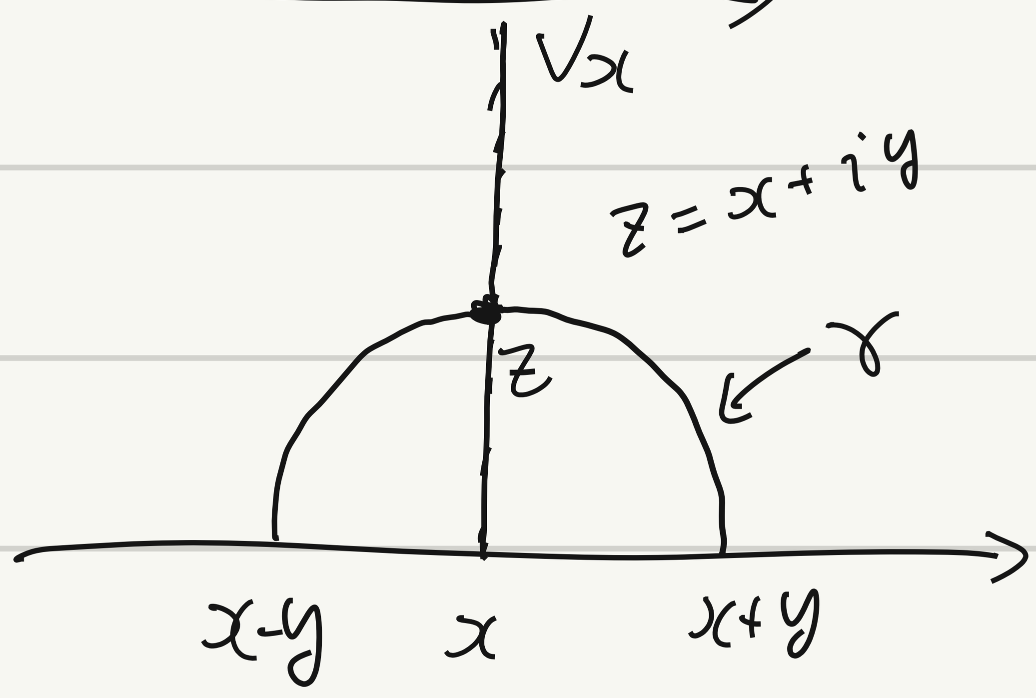
$$x = \frac{1}{2}\left(\frac{r_1^2 - r_2^2}{x_2 - x_1} + x_1 + x_2\right)$$



$\tau_2' \circ \tau_1' = \underline{\tau_2 \circ \tau_1} = \underline{\rho_\theta}$ 2θ- rotation.

$2\theta = \pi$

$\theta = \frac{\pi}{2}$



$\gamma = C(x, y)$

$$\tau_\gamma(w) = \frac{x\bar{w} + y^2 - x^2}{\bar{w} - x}$$

$$\tau_x(w) = -\bar{w} + 2x$$

$$\tau_\gamma \circ \tau_x(w) = \frac{x\overline{(-\bar{w}+2x)} + y^2 - x^2}{\overline{(-\bar{w}+2x)} - x} = \frac{-xw + 2x^2 + y^2 - x^2}{-w + x}$$

$$= \frac{-xw + y^2 + x^2}{-w + x}$$