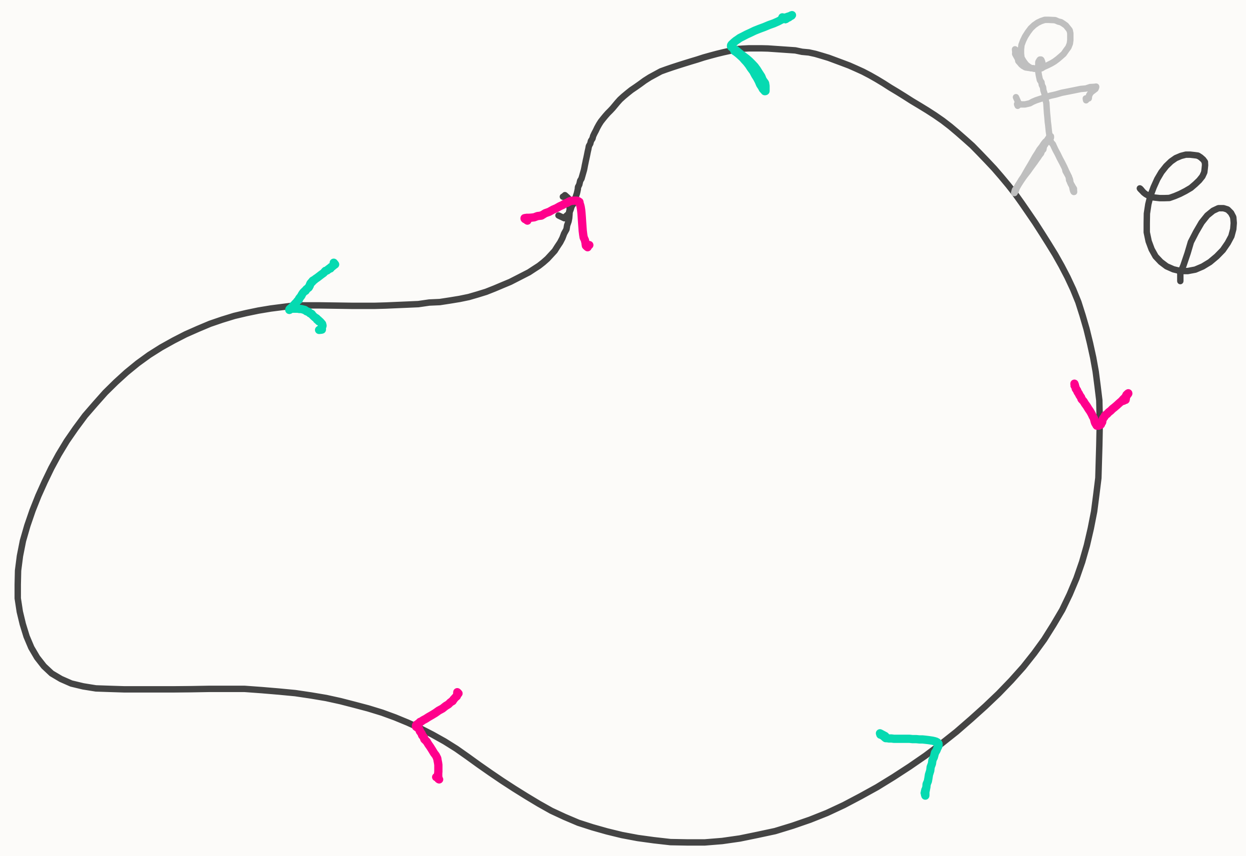
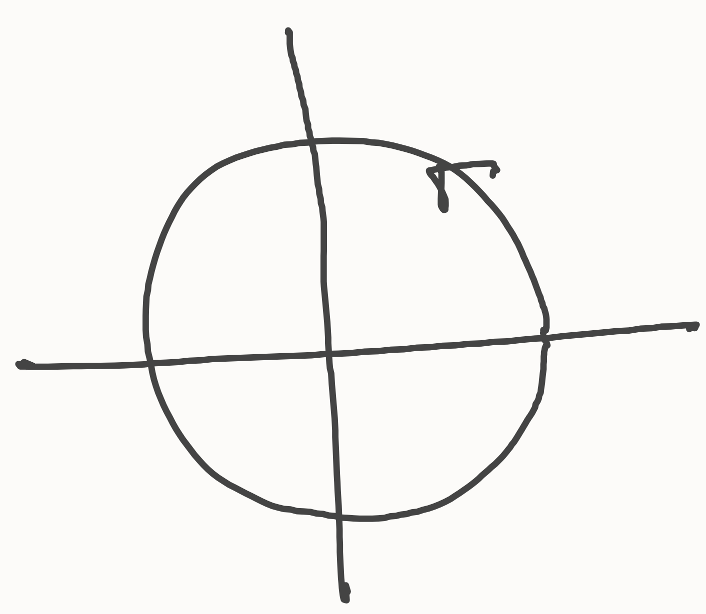


- Recorro antihorariamente $\mathcal{C}^+$ ↺

- Recorro horariamente. $\mathcal{C}^-$ ↻

$\sigma: [a,b] \longrightarrow \mathcal{C}$ una param. regular induce una orientación.

<u>Ejemplo:</u> $\mathcal{C} = \{(x,y) \in \mathbb{R}^2 : x^2+y^2=1\}$



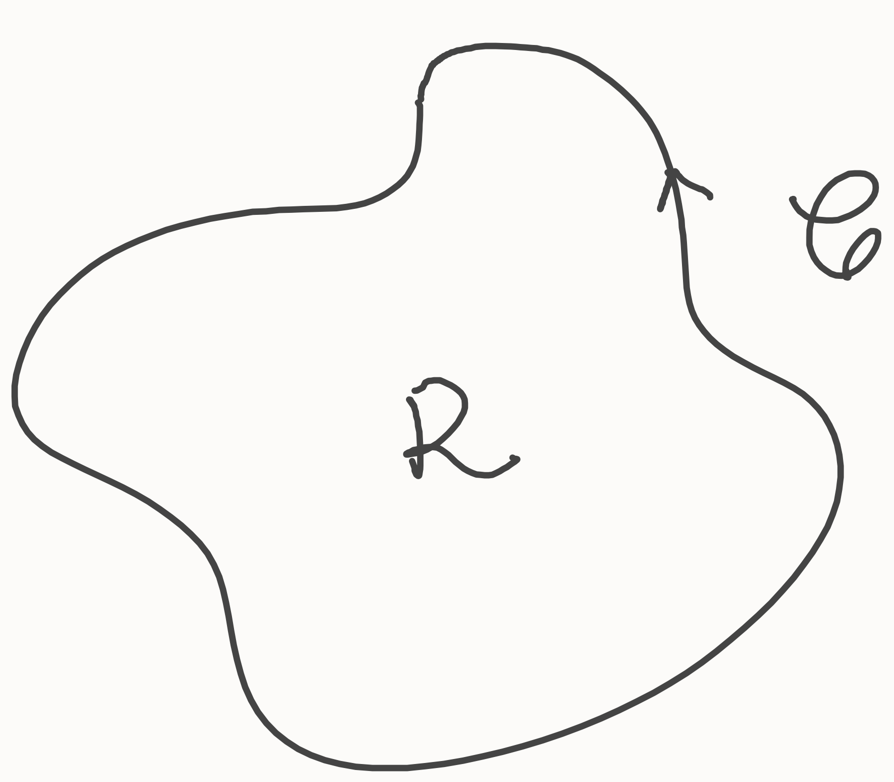
$\mathcal{C}^+$

$\sigma: [0,2\pi] \longrightarrow \mathbb{R}^2$

$\sigma(t) = (\cos(t), \operatorname{sen}(t))$

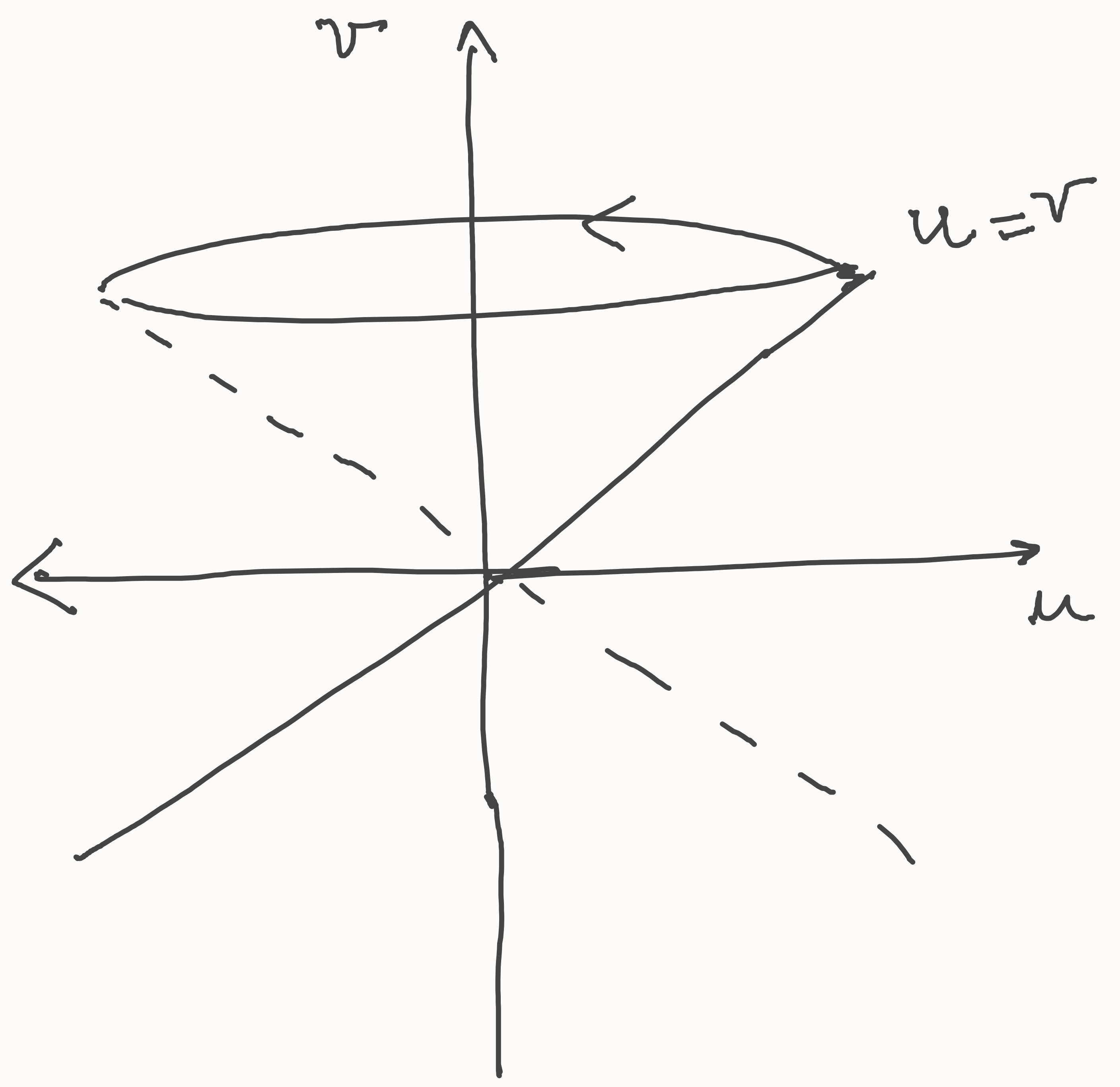
$\mathcal{C}^-$ $\quad \tilde{\sigma} = \sigma(2\pi - t) \quad \tilde{\sigma}: [0,2\pi] \longrightarrow \mathbb{R}^2$

— o —

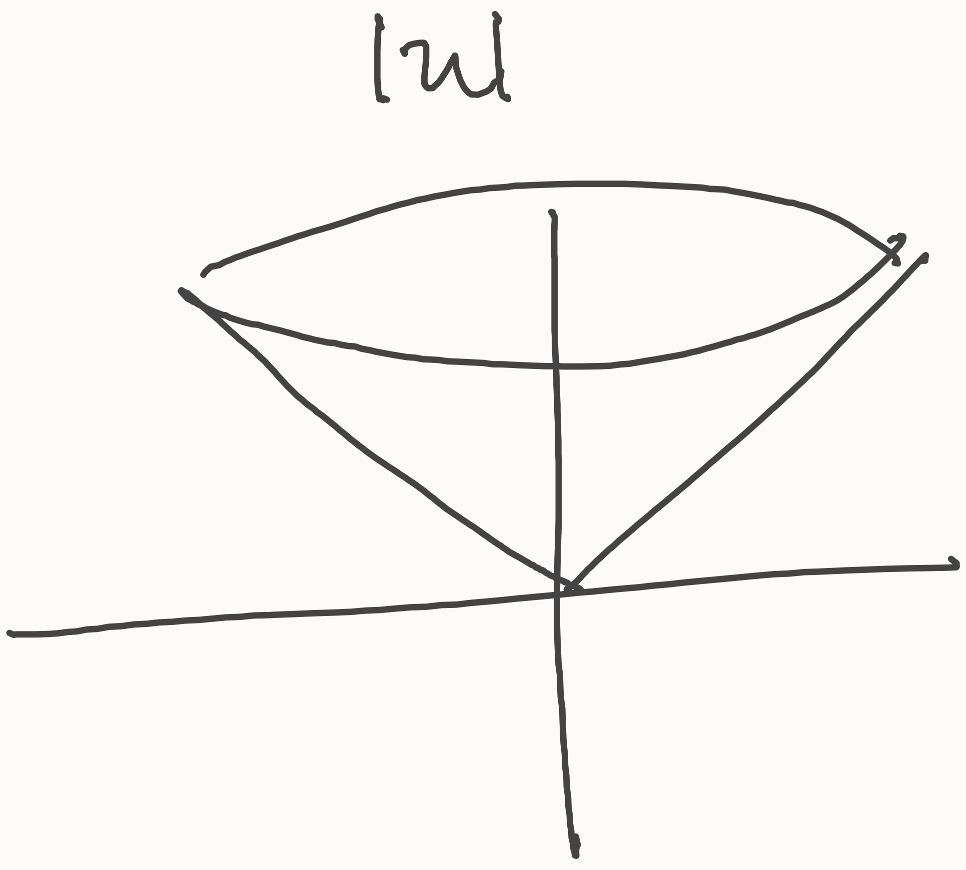


$F = (P,Q)$ $\mathcal{C}^1$ def. en $\mathbb{R}^2$

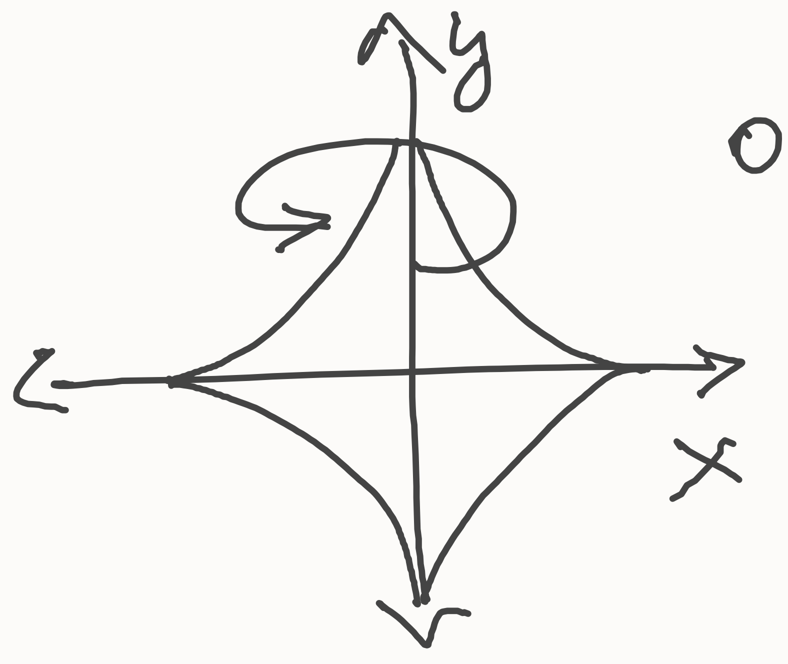
Green: $$\int_{\mathcal{C}^+} F\, ds = \iint_R \frac{\partial Q}{\partial x} - \frac{\partial P}{\partial y}\, dx\, dy.$$



$f(u) = u.$



$$\begin{cases} x = \cos^3(\theta) \\ y = \sin^3(\theta) \end{cases} \longrightarrow$$

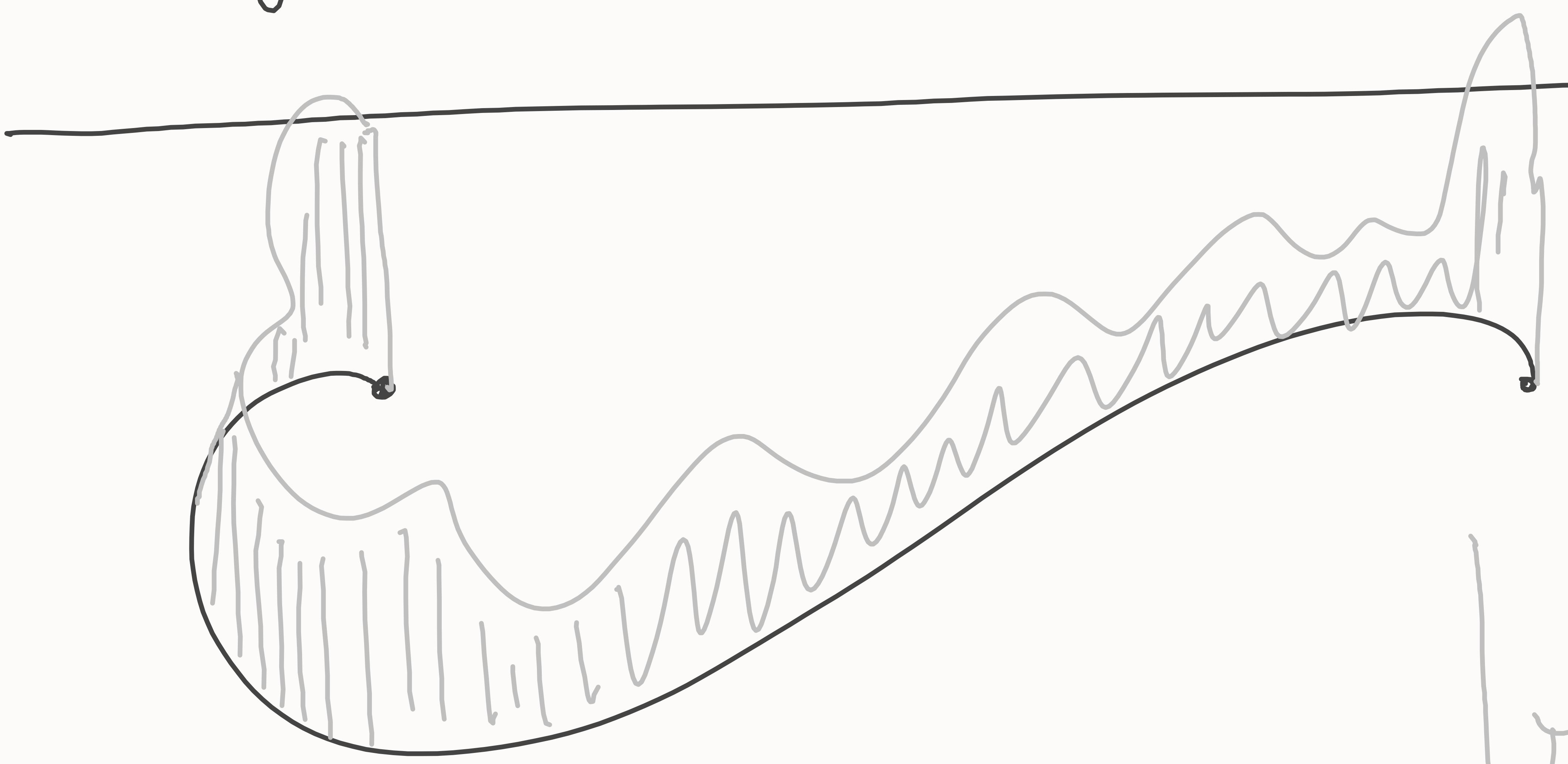


$0, \pi$

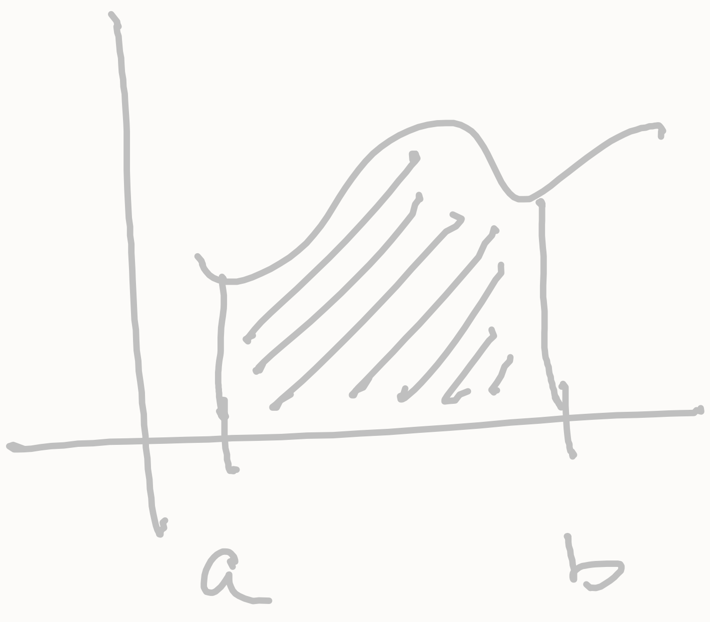
$$x^{2/3} + y^{2/3} = 1.$$

$x \geq 0 \qquad y^{2/3} = 1 - x^{2/3}$

$y \geq 0 \qquad y = (1 - x^{2/3})^{3/2}$



$\mathcal{C}$



- long($\mathcal{C}$)
- integrar $f : \mathcal{C} \longrightarrow \underline{\underline{\mathbb{R}}}$ en $\mathcal{C}$

  (si $f \geq 0$ $\quad \int_{\mathcal{C}} f \, ds$

- integra $F : \mathcal{C} \longrightarrow \mathbb{R}^2$ $\quad (\mathcal{C} \in \mathbb{R}^2)$

$\sigma : [a,b] \to \mathcal{C}$ param. regular.

- $\operatorname{long}(\mathcal{C}) = \int_a^b \|\sigma'(t)\| dt.$
- $\int_{\mathcal{C}} f \, ds = \int_a^b f(\sigma(t)) \cdot \|\sigma'(t)\| dt$
- $\int_{\mathcal{C}} F \, ds = \int_a^b \langle F(\sigma(t)), \sigma'(t) \rangle dt$

consideramos en $\mathcal{C}$ una orientación.

en sup.

S una sup. y $T : D \subseteq \mathbb{R}^2 \to \mathbb{R}^3$ una param. regular de S.

área(S), $\int_S f \cdot ds$, $\int_S F \cdot dS$.

- área$(S) = \iint_D \| T_u \times T_v \| du dv$
- $f : S \to \mathbb{R}$, $\int_S f \cdot ds = \iint_D \underbrace{f(T(u,v)) \cdot \| T_u \times T_v \|}\, du dv$
- $F : S \to \mathbb{R}^3$, $\int_S F ds = \iint_D \langle F(T(u,v)), T_u \times T_v \rangle du dv$

$T_u \times T_v =$
$T_u \times T_v (u,v)$.

S tiene q' tener una orient. sup q' es la dada x T