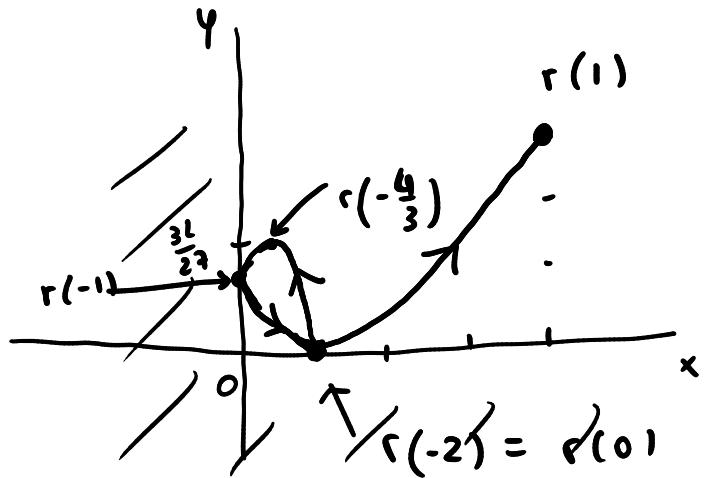
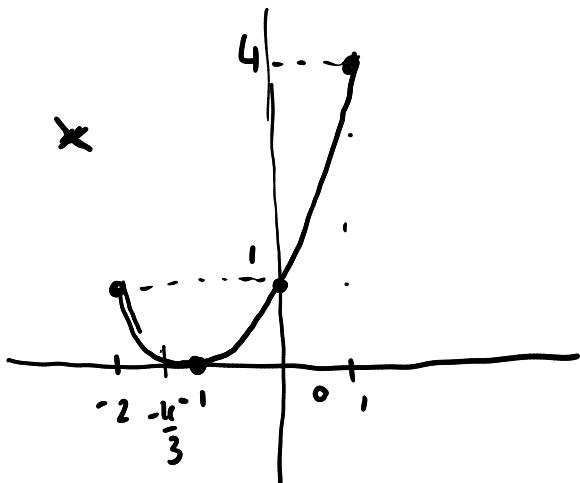


Completa l'esempio

$$\begin{aligned} r(t) &= \left(\underbrace{(t+1)^2}_{\geq 0}, \underbrace{t^2(t+2)}_{\geq 0} \right), \quad t \in [-2, 1] \\ &=: x(t) \quad := y(t) \end{aligned}$$

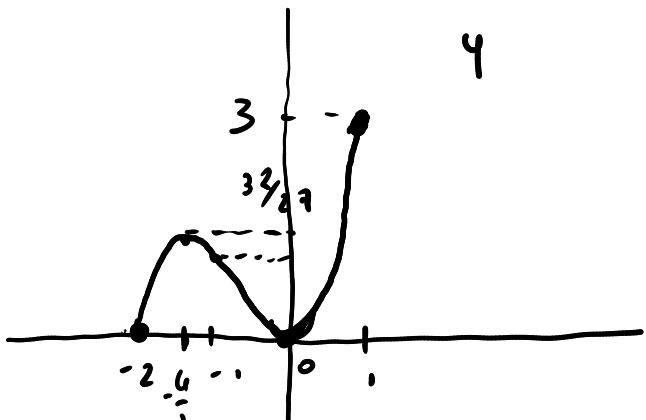


$$y(t) = t^2(t+2) = t^3 + 2t^2$$

$$y'(t) = 3t^2 + 4t$$

$$y'(t)=0 \iff t=0, \quad t=-\frac{4}{3}$$

$$y\left(-\frac{4}{3}\right) = \frac{16}{9} \cdot \frac{2}{3} = \frac{32}{27}$$

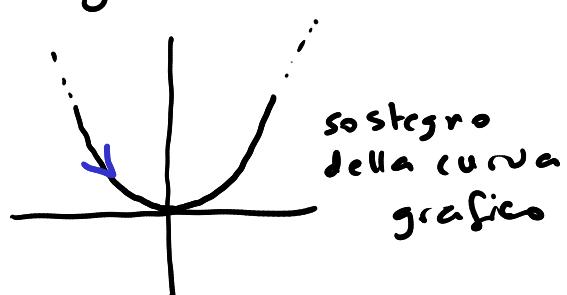


Esempi di curva grafico:

- $f(t) = t^2, \quad t \in \mathbb{R}$

Parametrizzazione della curva grafico associata:

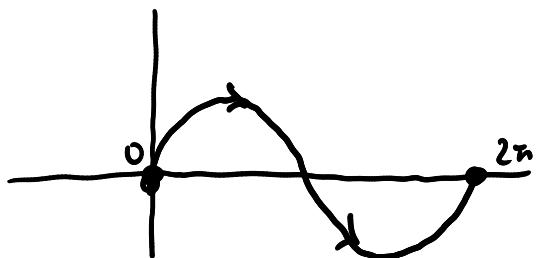
$$r(t) = (t, t^2), \quad t \in \mathbb{R}$$



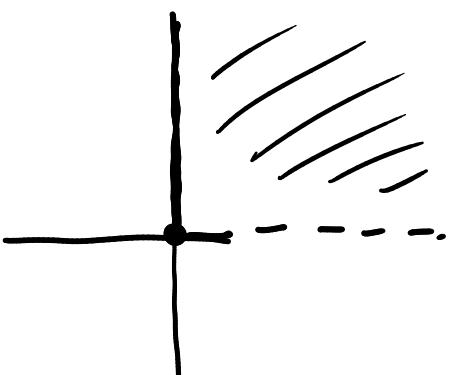
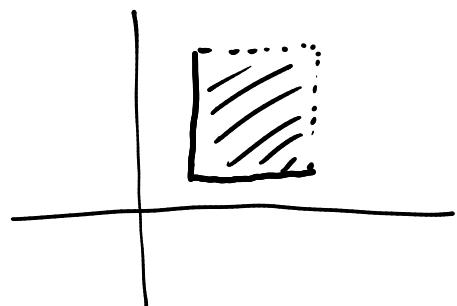
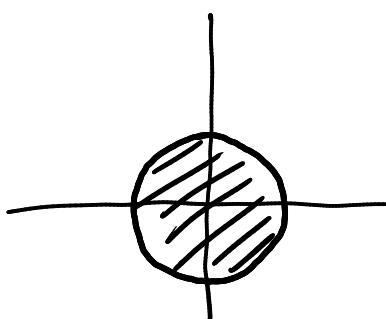
- $f(t) = \sin(t), t \in [0, 2\pi]$

Parametrizzò: $r(t) = (t, \sin(t)), t \in [0, 2\pi]$

Sostegno:



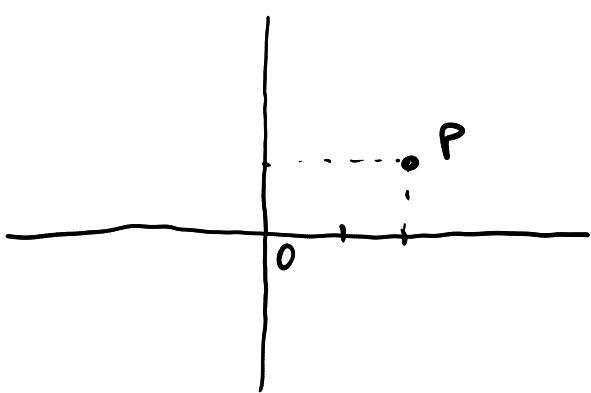
Esempi di insiem: di parametri in \mathbb{R}^2 :



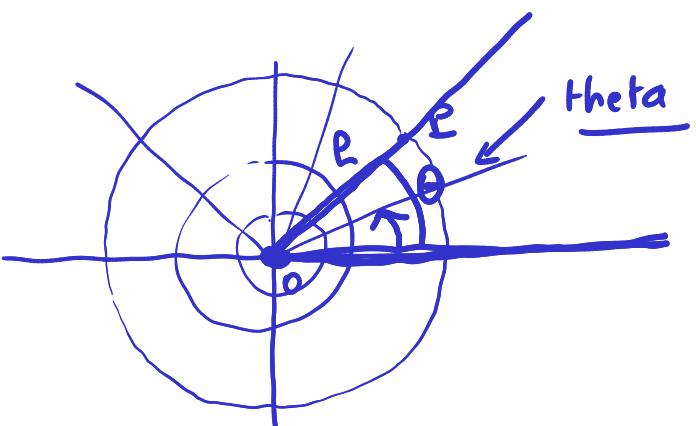
No!

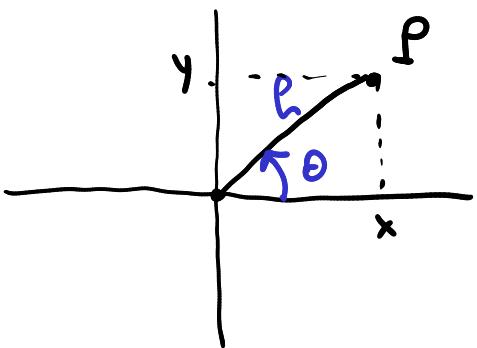
Coordinate polari in \mathbb{R}^2 :

ρ : rho



$\rho(x, y)$





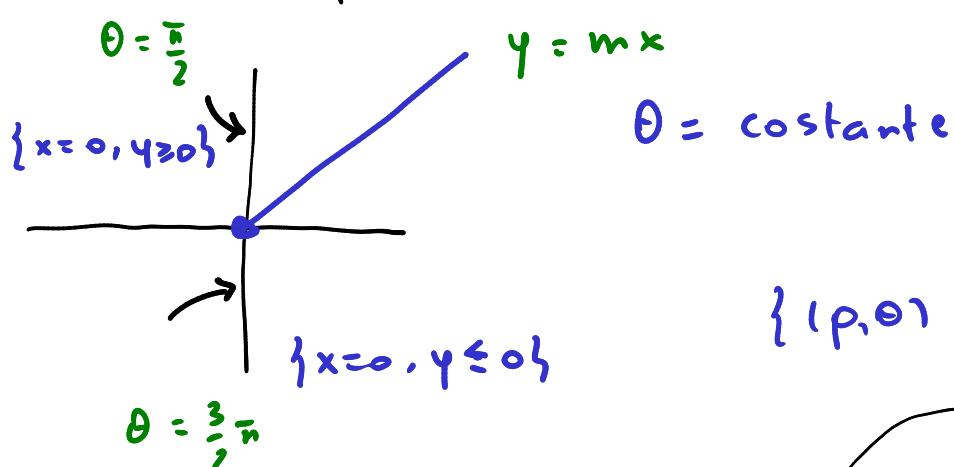
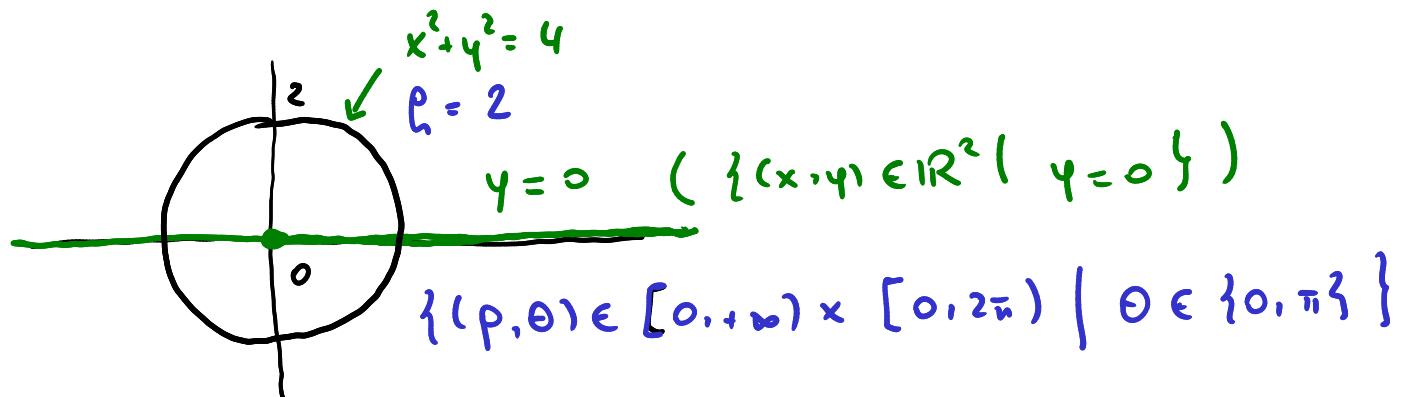
$$\begin{cases} x = \rho \cos \theta \\ y = \rho \sin \theta \end{cases}$$

$\rho \in [0, +\infty)$ $\theta \in [0, 2\pi) \cup [-\pi, 0) \dots$

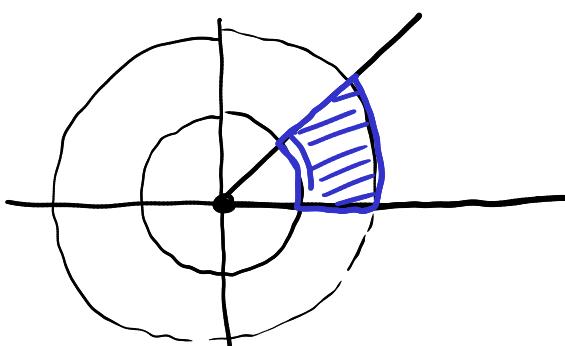
\rightarrow determino θ risolvendo il sistema

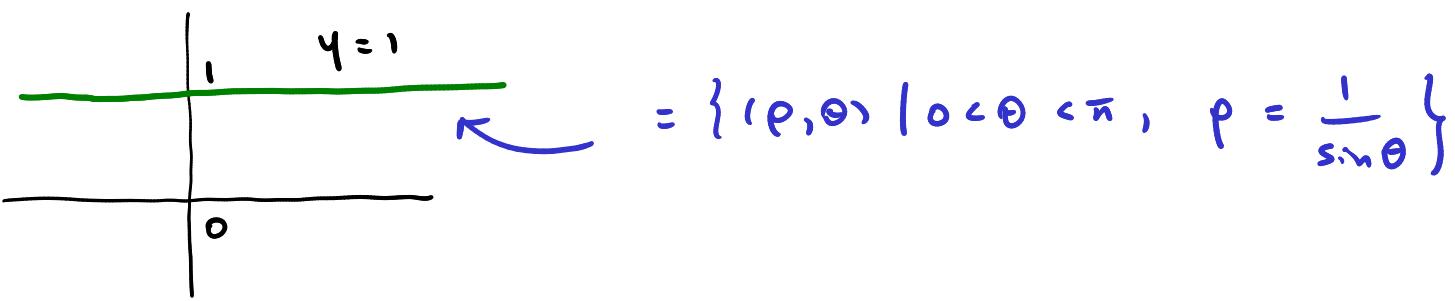
$$\begin{cases} \cos \theta = \frac{x}{\sqrt{x^2+y^2}} \\ \sin \theta = \frac{y}{\sqrt{x^2+y^2}} \end{cases} \quad \text{se } x^2+y^2 \neq 0$$

Esempi di "traduzione"



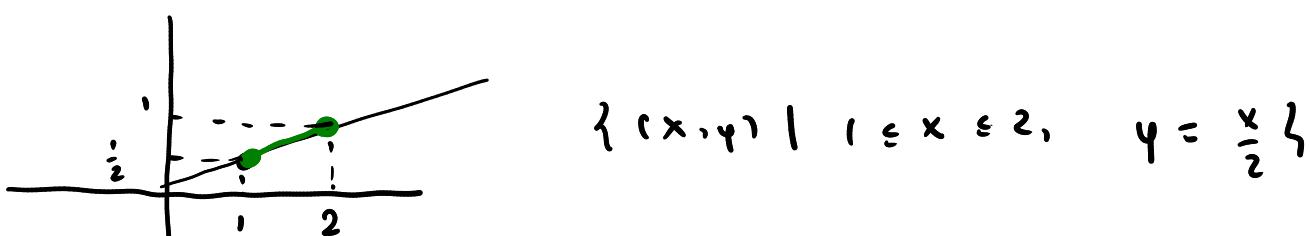
$$\{(\rho, \theta) \mid 1 \leq \rho \leq 2, 0 \leq \theta \leq \frac{\pi}{4}\}$$



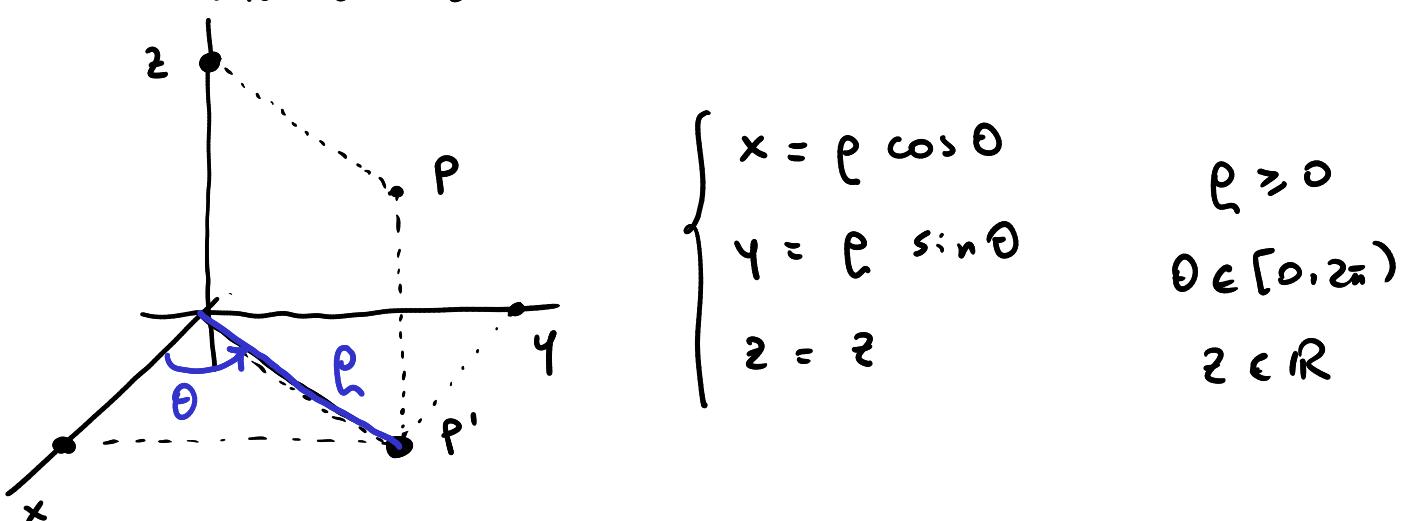


$$\begin{cases} x = \rho \cos \theta \\ y = \rho \sin \theta \end{cases} \quad y = 1 \iff \rho \sin \theta = 1$$

$$\iff \rho = \frac{1}{\sin \theta}$$



Coordinate cilindriche in \mathbb{R}^3

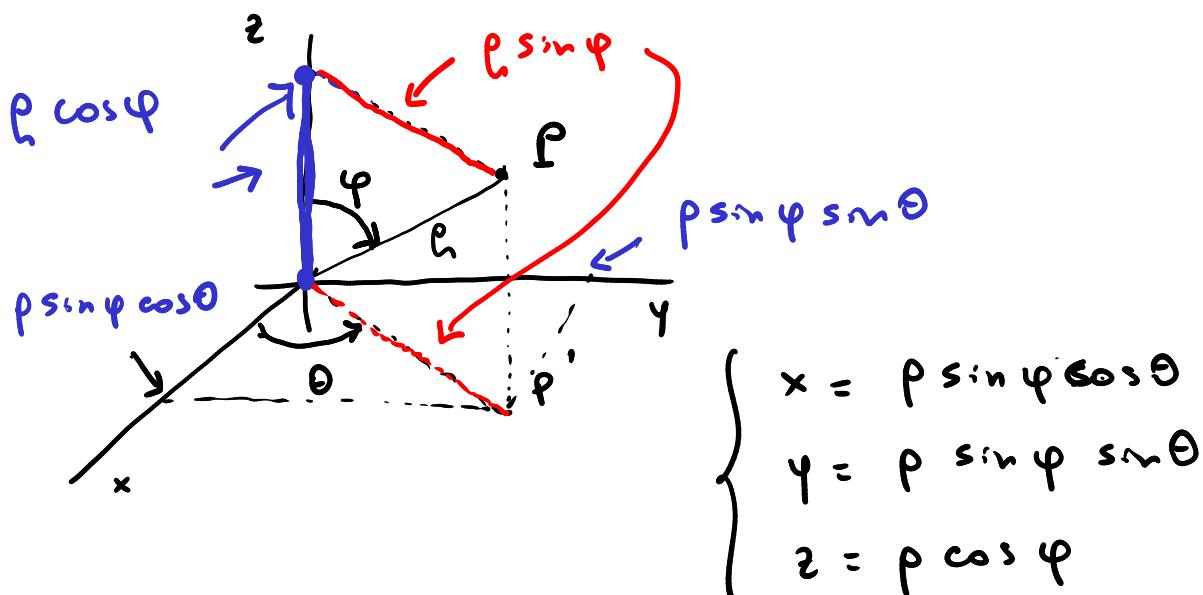


$\rho = \text{costante}$: sup. laterale del cilindro
 $(x^2 + y^2 = \text{costante})$

$\theta = \text{costante}$: semipiano

$z = \text{costante}$: piano parallelo al piano xy

Coordinate sferiche (o polari) in \mathbb{R}^3



$$\rho \in [0, +\infty)$$

$$\varphi \in [0, \pi]$$

colatitudine

$$\theta \in [0, 2\pi]$$

$\rho = \text{costante}$: sfera

$\varphi = \text{costante}$: cono

$\theta = \text{costante}$: semipiano

Ese:

$$f(x, y) = x^2 + y^2 \quad (x, y) \in \bar{B}_2(0, 0)$$

insieme
di parametri

Parametrisazione:

$$\sigma: \bar{B}_2(0, 0) \rightarrow \mathbb{R}^3 \text{ t.c.}$$

$$\sigma(u, v) = (u, v, u^2 + v^2)$$