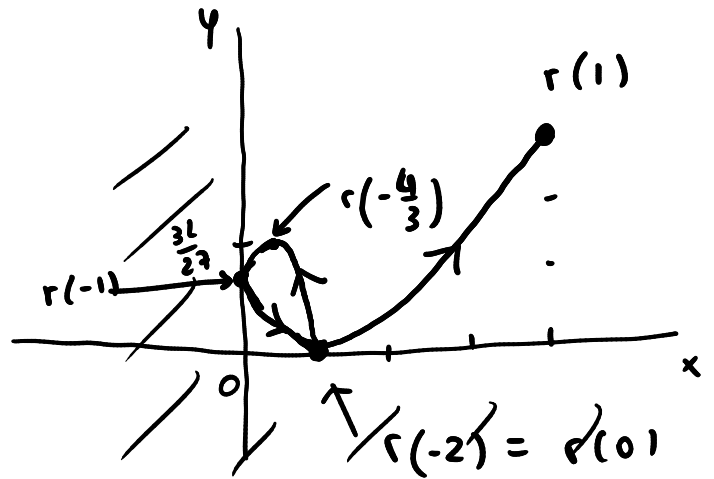
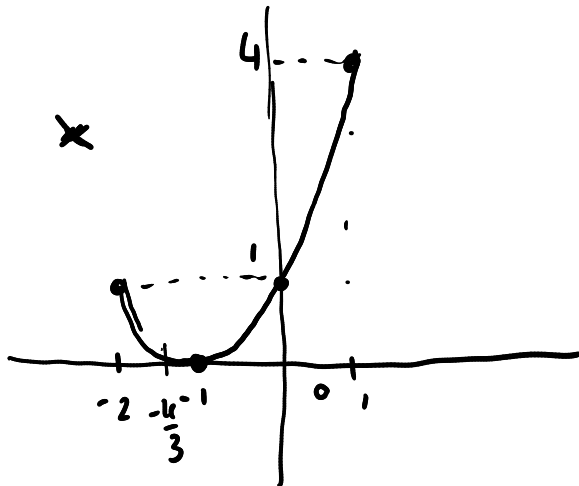


Completo l'esempio:

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

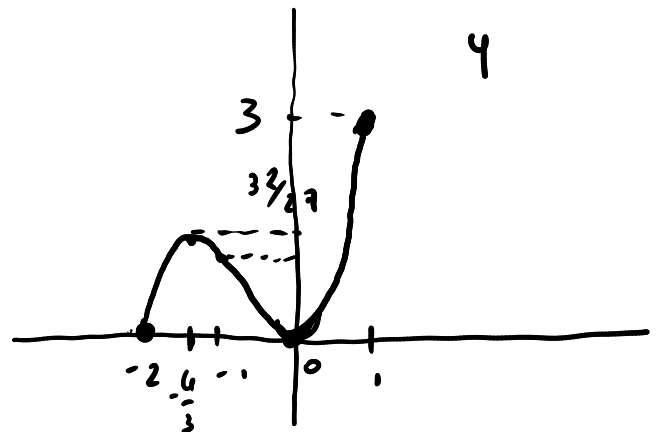


$$y(t) = t^2(t+2) = t^3 + 2t^2$$

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

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

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

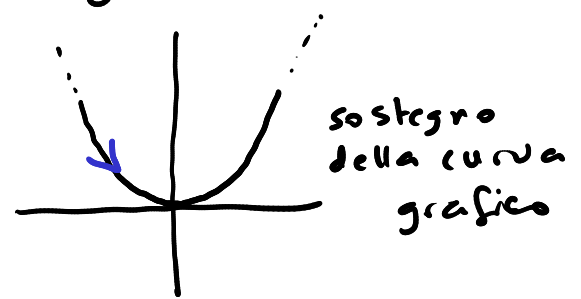


Esempi di curva grafico:

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

Parametrizzazione della curva grafico associata:

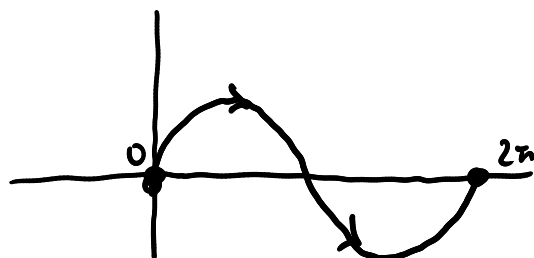
$$r(t) = (t, t^2), \quad t \in \mathbb{R}$$



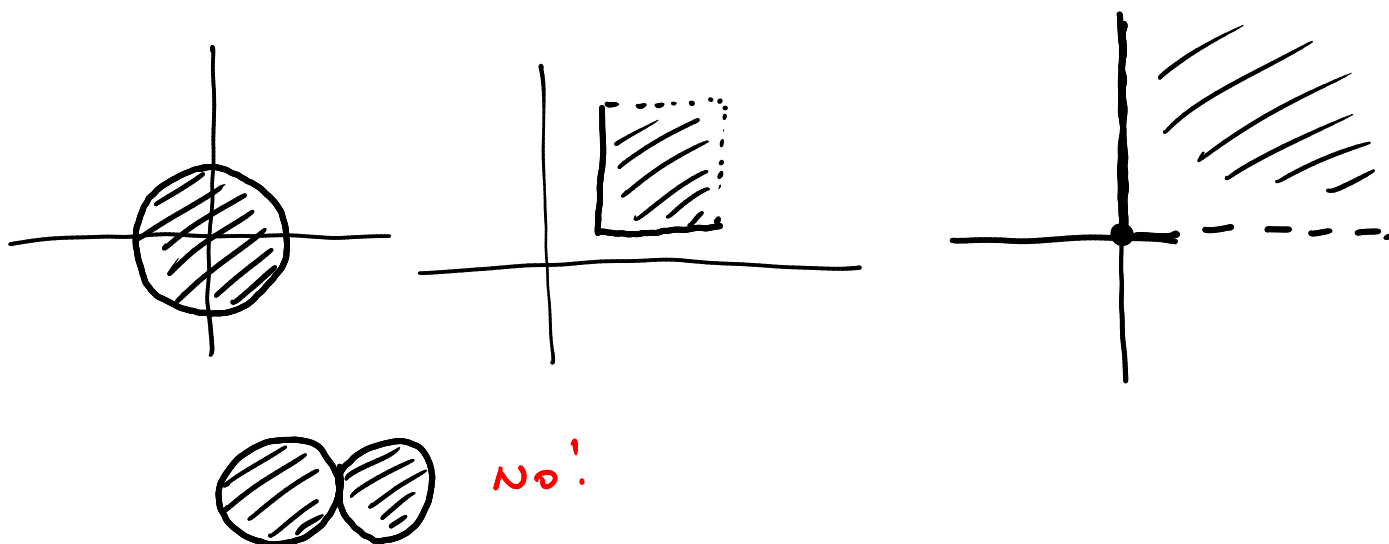
- $f(t) = \sin(t)$, $t \in [0, 2\pi]$

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

Disegno:

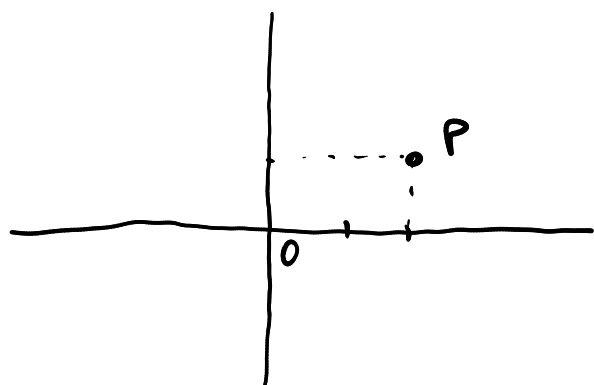


Esempi di insiemi di parametri in \mathbb{R}^2 :

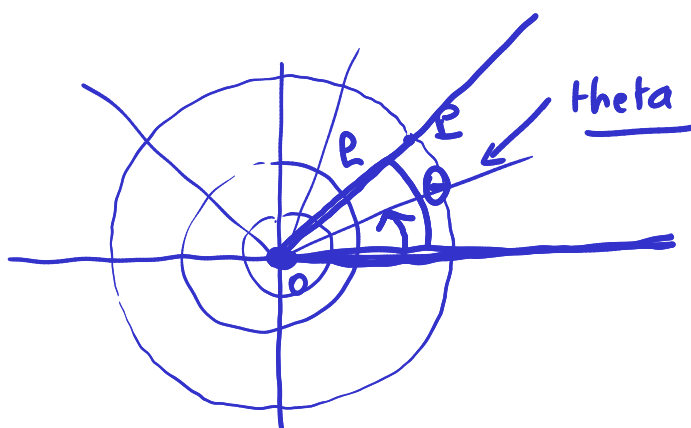


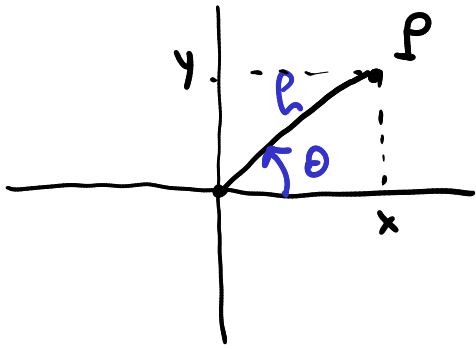
Coordinate polari in \mathbb{R}^2 :

ρ : rho



$P(x, y)$





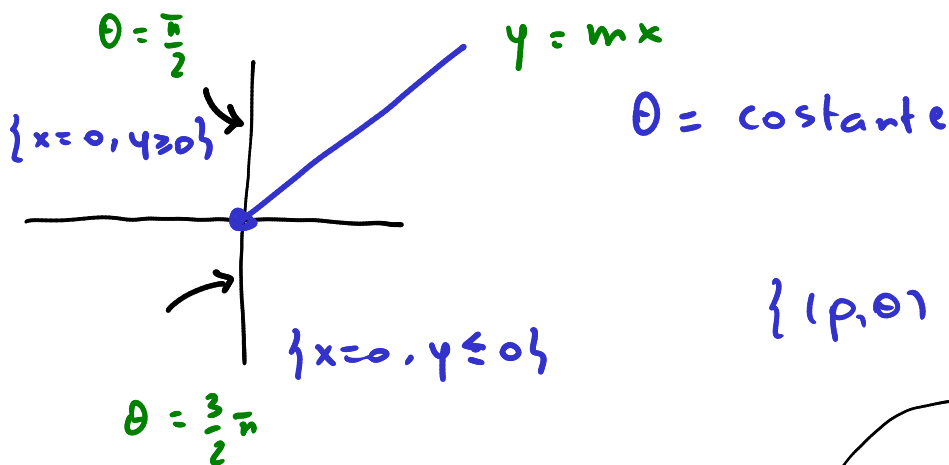
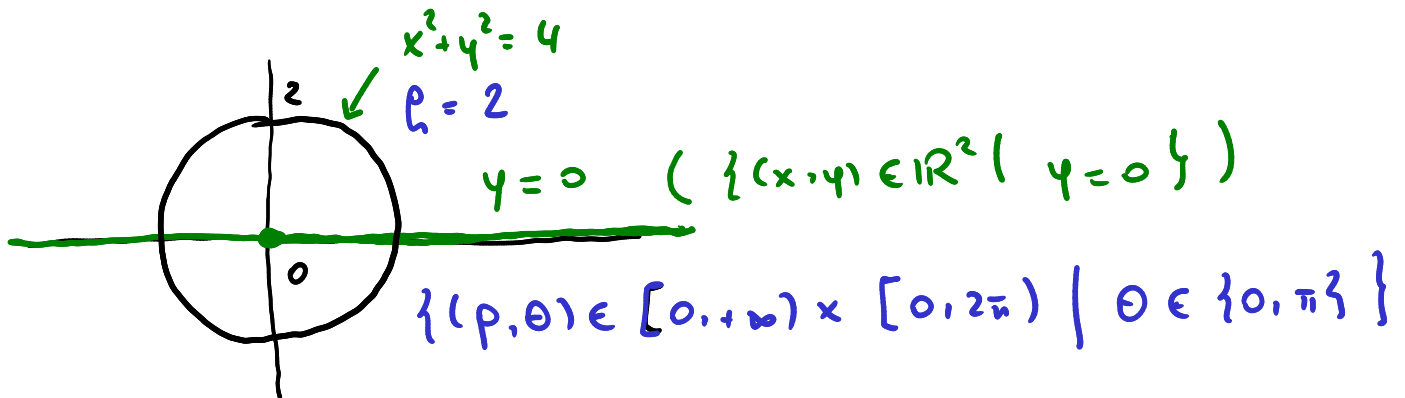
$$\begin{cases} x = \rho \cos \theta \\ y = \rho \sin \theta \end{cases}$$

$\rho = \sqrt{x^2 + y^2}$
 $\rho \in [0, +\infty)$ → determino θ risolvendo il sistema

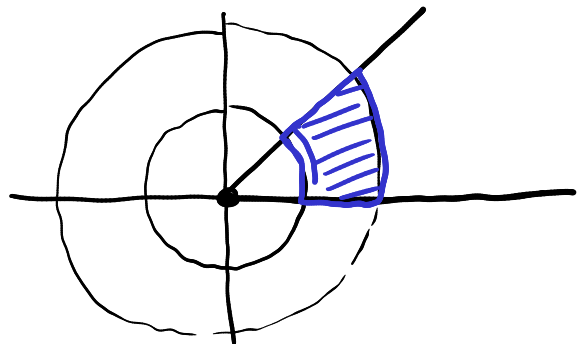
$$\begin{cases} \cos \theta = \frac{x}{\sqrt{x^2 + y^2}} \\ \sin \theta = \frac{y}{\sqrt{x^2 + y^2}} \end{cases} \quad \text{se } x^2 + y^2 \neq 0$$

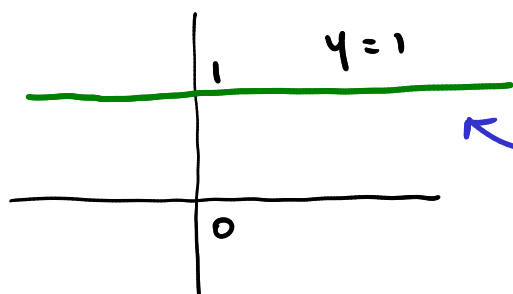
$\theta \in [0, 2\pi)$
 $\theta \in [-\pi, \pi) \dots$

Esempi di "traduzione"



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



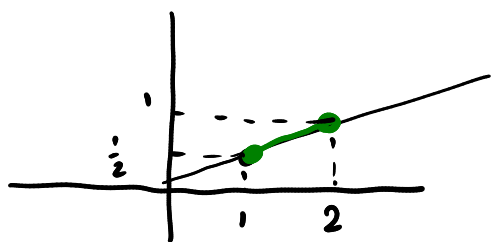


$$= \{ (p, \theta) \mid 0 < \theta < \pi, p = \frac{1}{\sin \theta} \}$$

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

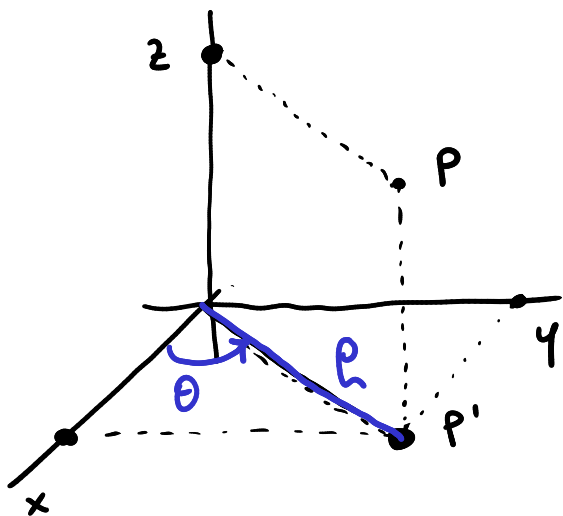
$$y = 1 \Leftrightarrow p \sin \theta = 1$$

$$\Leftrightarrow p = \frac{1}{\sin \theta}$$



$$\{ (x, y) \mid 1 \leq x \leq 2, y = \frac{x}{2} \}$$

Coordinate cilindriche in \mathbb{R}^3



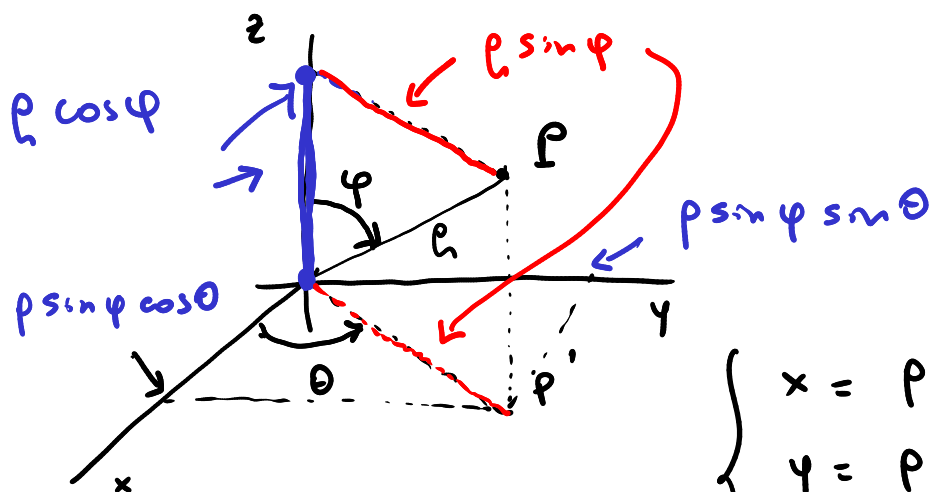
$$\begin{cases} x = p \cos \theta \\ y = p \sin \theta \\ z = z \end{cases} \quad \begin{aligned} p &\geq 0 \\ \theta &\in [0, 2\pi) \\ z &\in \mathbb{R} \end{aligned}$$

$p = \text{costante}$: 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



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

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

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

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

colatitude

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

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

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

Es:

$$f(x, y) = x^2 + y^2$$

$$(x, y) \in \bar{B}_2(0, 0)$$

insieme
di parametri

Parametri 220:

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

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