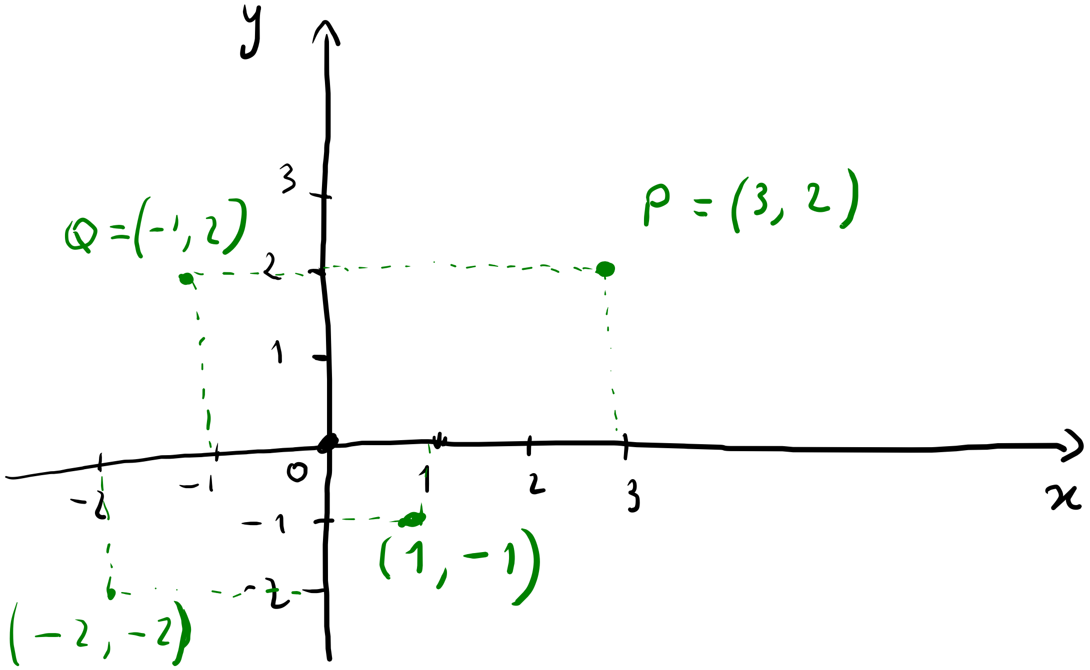
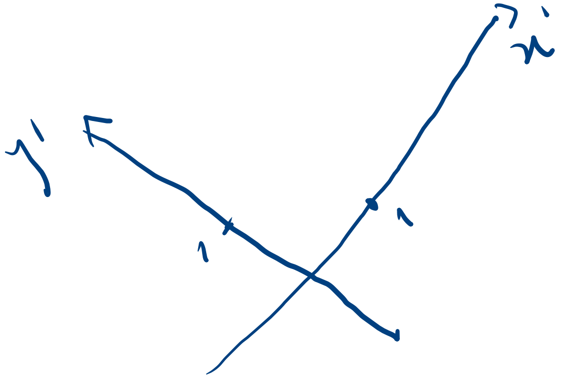
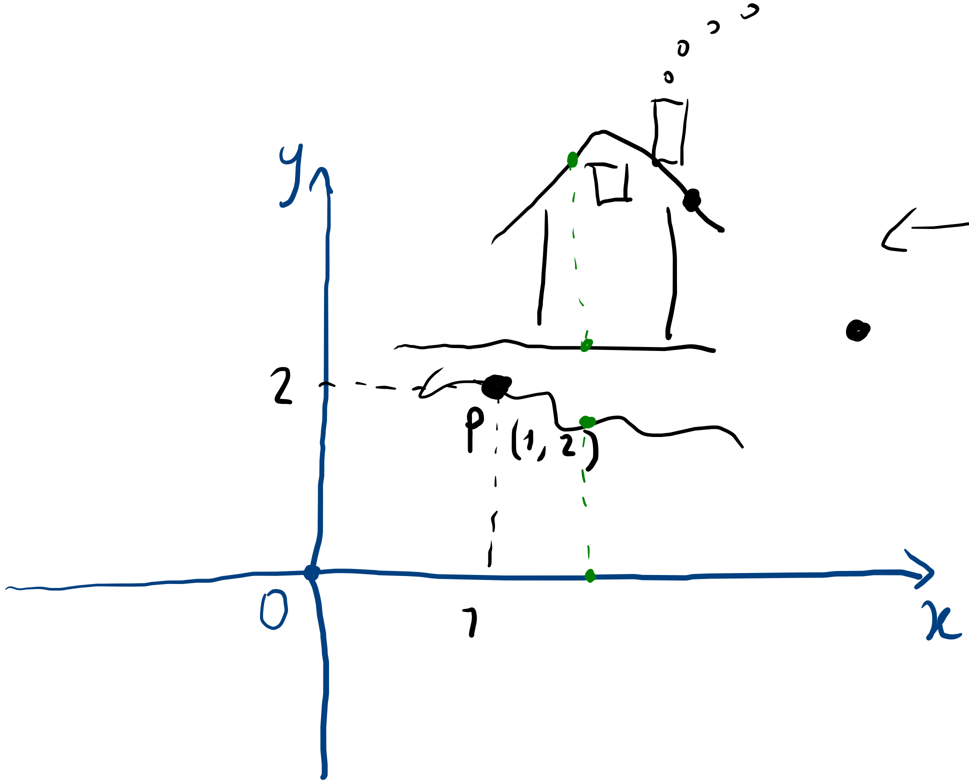
Piano euclideo

$$\pi \xleftrightarrow{\text{biunivoca}} \mathbb{R}^2 = \mathbb{R} \times \mathbb{R}$$







$U \subset \mathbb{R}^2$

$U : \mathbb{R} \to \mathbb{R}$

$1 \; U \; 2$

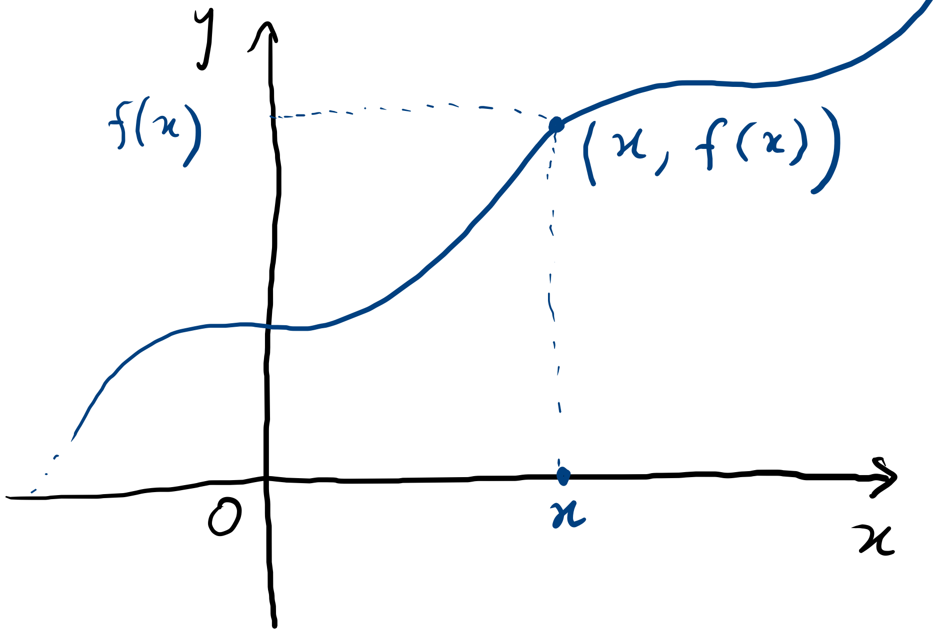
Relazione $\longleftrightarrow$ disegno

X, Y insiemi

$R \subset X \times Y$

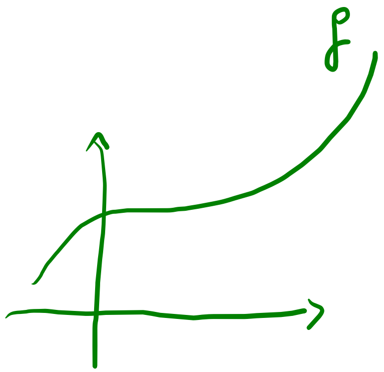
$$\boxed{\mathcal{R} = (X, Y, R)}$$

$f : \mathbb{R} \longrightarrow \mathbb{R}$



$g : \mathbb{R} \longrightarrow \mathbb{R}$

$$\boxed{G_g = \{ (x, g(x)) \mid x \in \mathbb{R} \}}$$

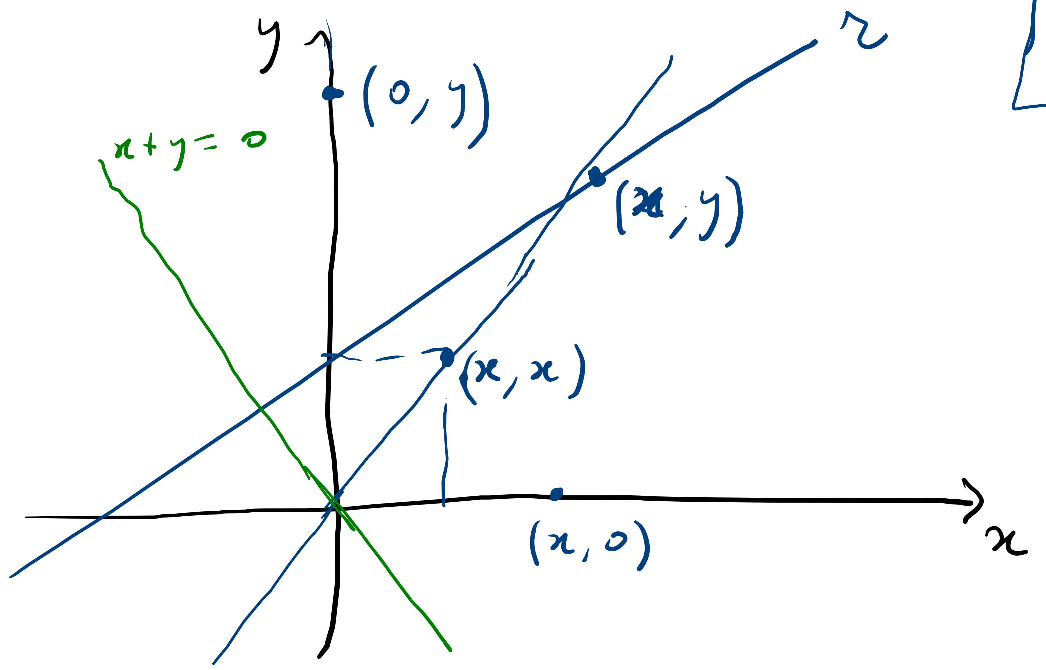


Polinomi

$$p = \overset{3}{3xy^2} - \overset{1}{x} + \overset{1}{\tfrac{1}{2}y} + \overset{5}{x^5}$$

$\deg p = 5$

$\deg(xy^5 - y) = 6$



$$\boxed{ax + by + c = 0}$$

$a, b, c \in \mathbb{R}$

a, b non entrambi nulli

Es

$x = 0$ asse y

$y = 0$ asse x

$x - y = 0$

$x + y = 0$

$$\boxed{ax + by + c = 0}$$

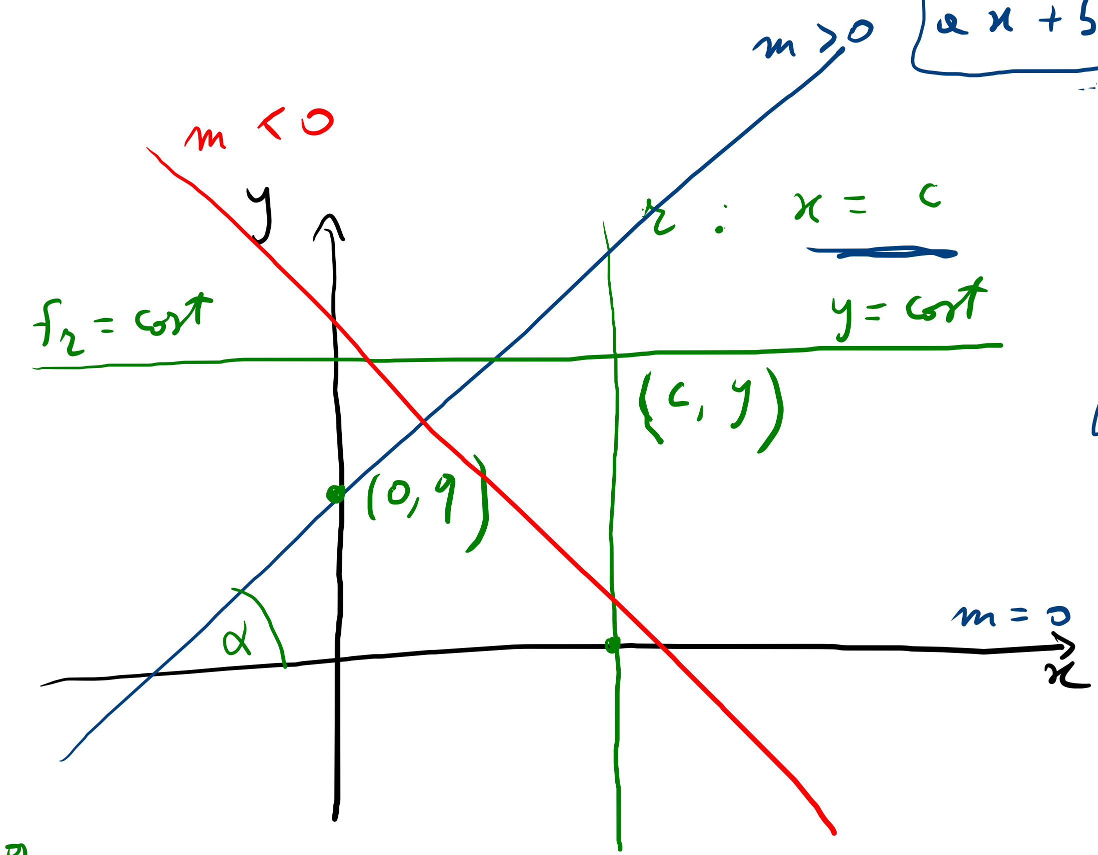
$$b \neq 0$$

$$\underbrace{a b^{-1}}x + y + \underbrace{c b^{-1}} = 0$$

$$\boxed{y = mx + q}$$

$$m = -a b^{-1}$$

$$q = -c b^{-1}$$



$$f_r(0) = q$$

m coefficiente angolare

$$\boxed{m = \tan \alpha}$$

$$f_r : \mathbb{R} \longrightarrow \mathbb{R}$$

$$f_r(x) = mx + q$$

$$m, q \in \mathbb{R}$$

$$m = 0 \qquad f_r(x) = q \quad \forall x \in \mathbb{R}$$

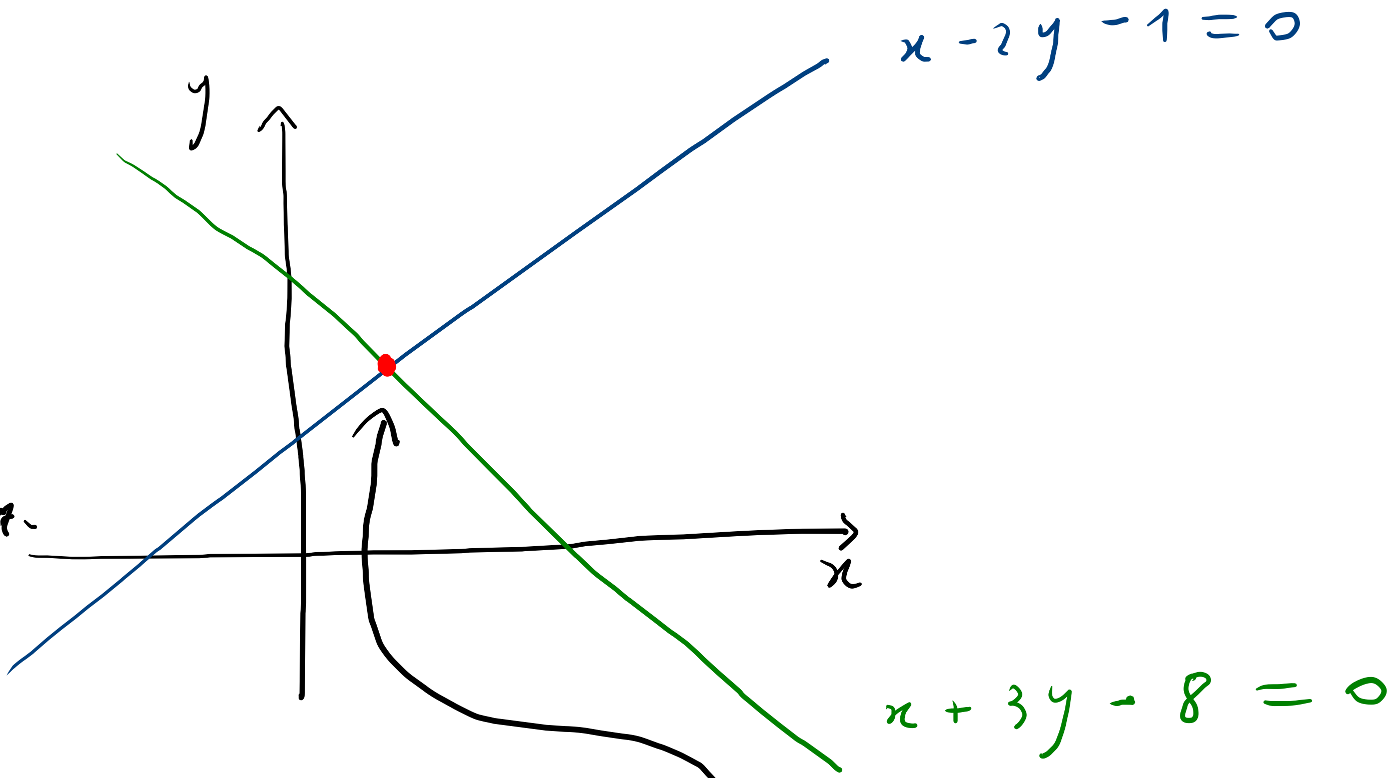
$$\begin{cases} x - 2y - 1 = 0 \\ x + 3y - 8 = 0 \end{cases}$$

Soluzioni: coppie (u, v) che soddisfano le equaz.

2ª − 1ª

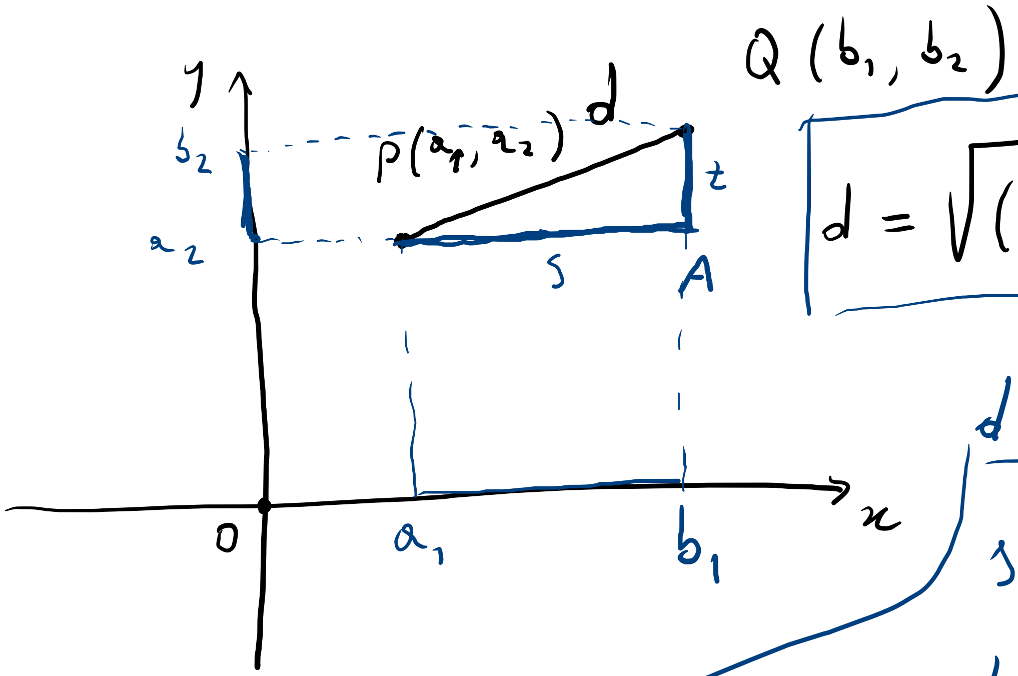
$$\begin{cases} 5y - 7 = 0 \\ x - 2y - 1 = 0 \end{cases}$$

$$\begin{cases} y = \frac{7}{5} \\ x = 2y + 1 = \frac{14}{5} + 1 = \frac{19}{5} \end{cases}$$



L'unica soluzione è

$$\underline{\left(\frac{19}{5}, \frac{7}{5}\right)}$$



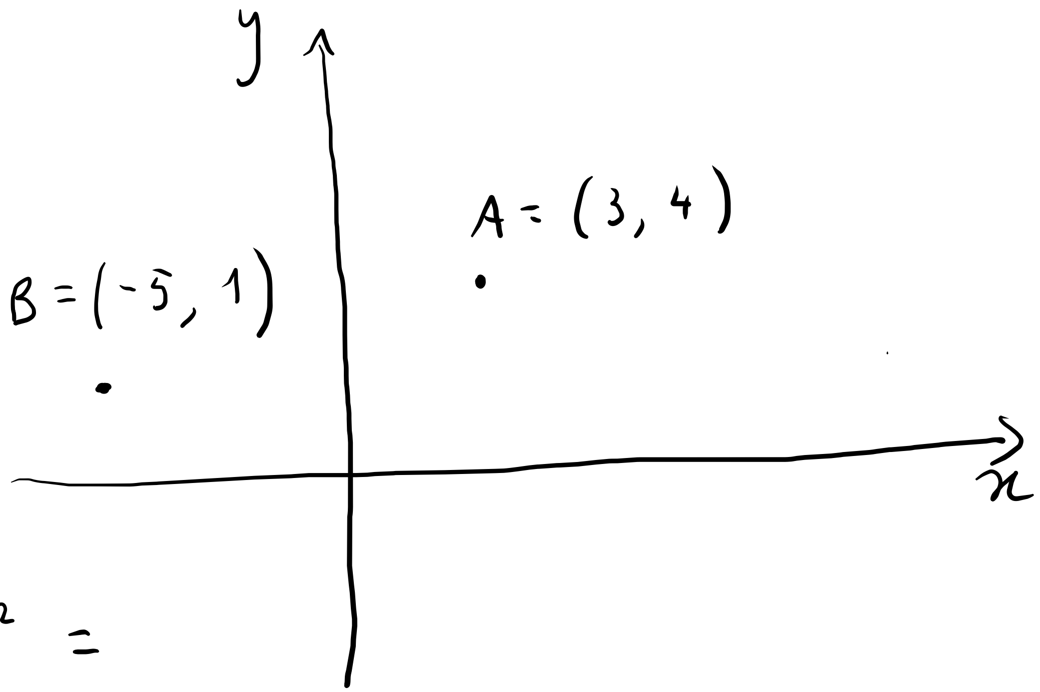
$$\boxed{d = \sqrt{(a_1 - b_1)^2 + (a_2 - b_2)^2}}$$

$$d^2 = s^2 + t^2$$

$$s = |b_1 - a_1|$$

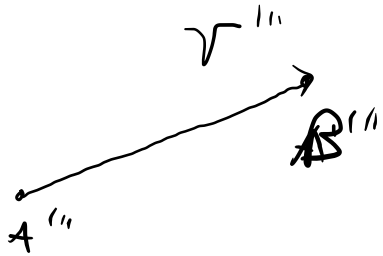
$$t = |b_2 - a_2|$$

$$d^2 = (b_1 - a_1)^2 + (b_2 - a_2)^2$$



$$d(A,B) = \sqrt{(3+5)^2 + (4-1)^2} =$$
$$= \sqrt{64 + 9} = \sqrt{73}$$

Equipollenza è rel. d'equivalenza

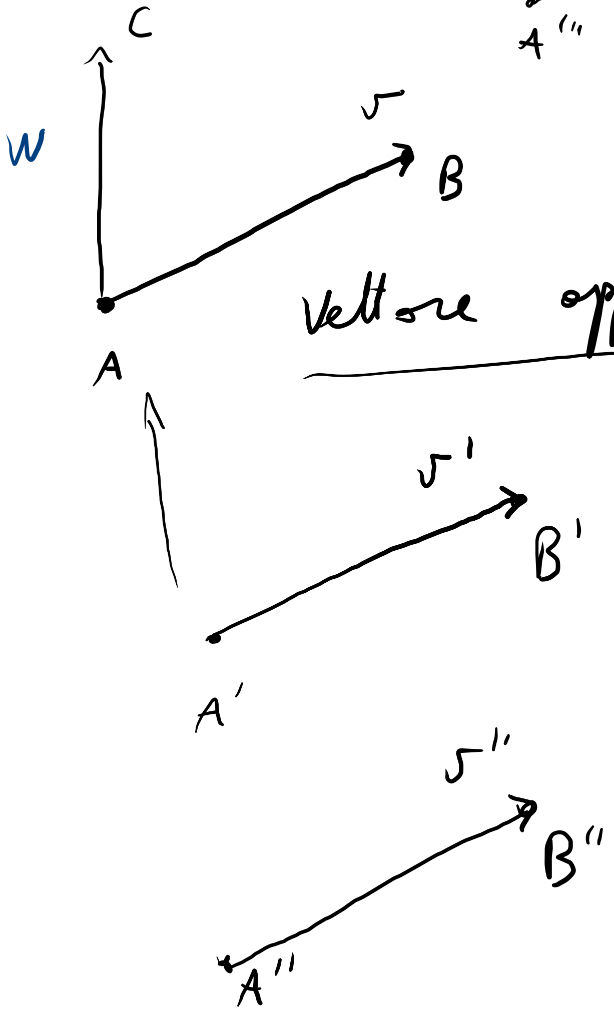


$v \sim v'$ e $v' \sim v''$
$\Rightarrow v \sim v''$

tilde
↓
$v \sim v'$

Le classi di equipollenza sono chiamate

vettori geometrici



Vettore applicato in A

v e v' sono **equipollenti**

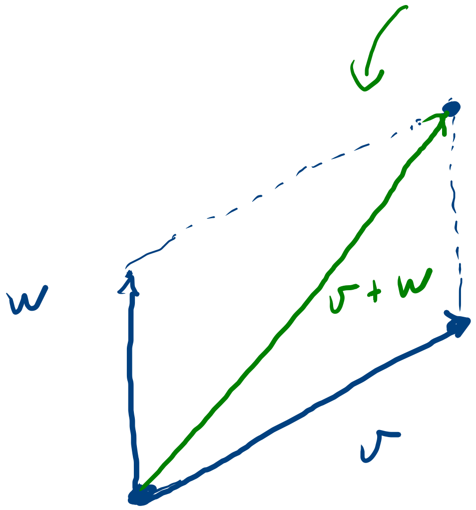
se
1) sono paralleli
2) hanno "lo stesso verso"
3) hanno le stesse lunghezze

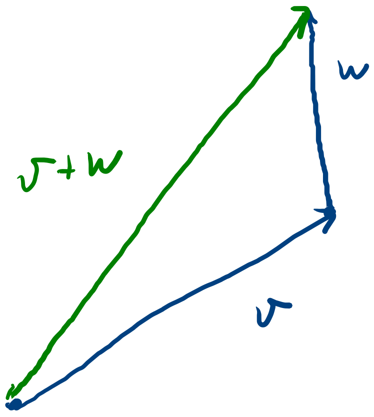
$$d(A,B) = d(A',B')$$

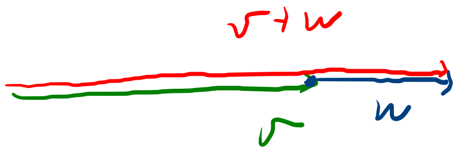
Vett. geom.:

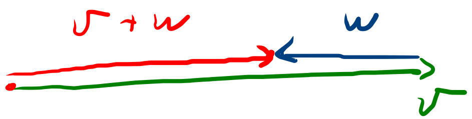
$v, w \rightsquigarrow v + w = w + v$

Commutative









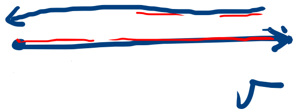
$$(v+w)+u = v+(w+u)$$
$$\forall\, v, w, u \in V$$

Vettore nullo

$\bullet\ 0$

$$v + \underline{0} = v$$

$v' = v$ col verso opposto



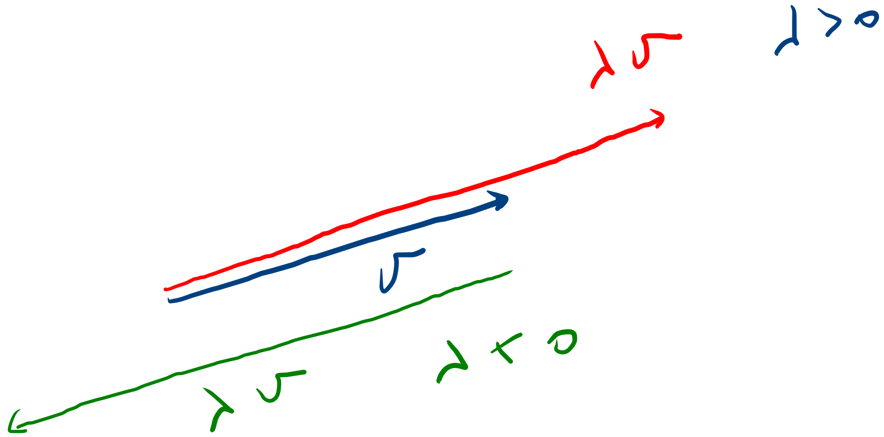
$$v' =: -v$$
$$v + (-v) = 0$$
$$\quad\|$$
$$v - v = 0$$

$$\mathbb{R} \times V \longrightarrow V$$

$$(\lambda, v) \longmapsto \lambda \cdot v$$

V = insieme dei vettori geom.

moltiplicazione (o prodotto) per uno scalare.



$0 \cdot v := 0$

Scalari : $\mathbb{R}$

V forma uno spazio vettoriale

$$\begin{cases} \lambda(v+w) = \lambda v + \lambda w \\ 1 \cdot v = v \\ (\lambda\mu) v = \lambda(\mu v) \\ (\lambda+\mu) v = \lambda v + \mu v \end{cases}$$