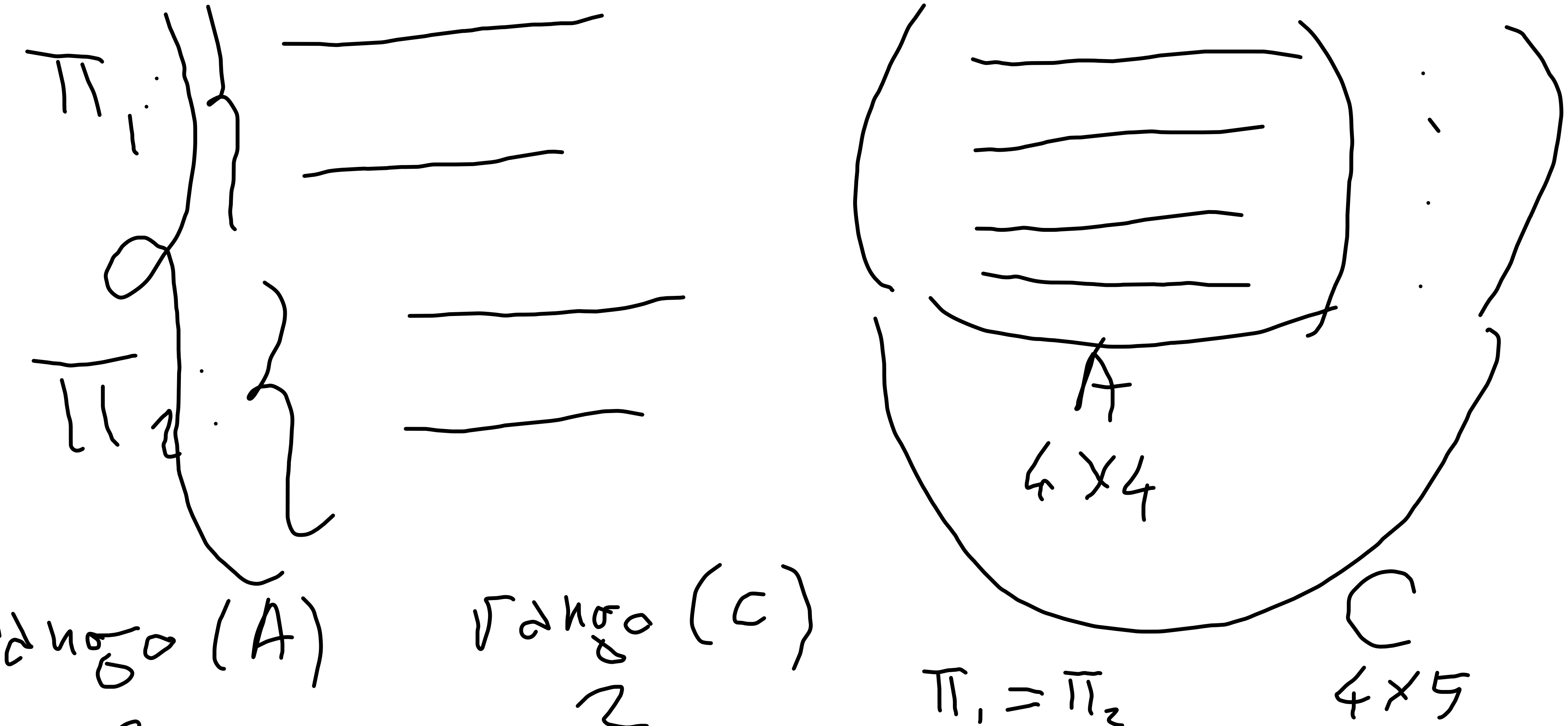
$\mathcal{A}^3$

$$\begin{cases} \pi_1 : ax + by + cz = d \\ \pi_2 : ex + fy + gz = h \end{cases}$$

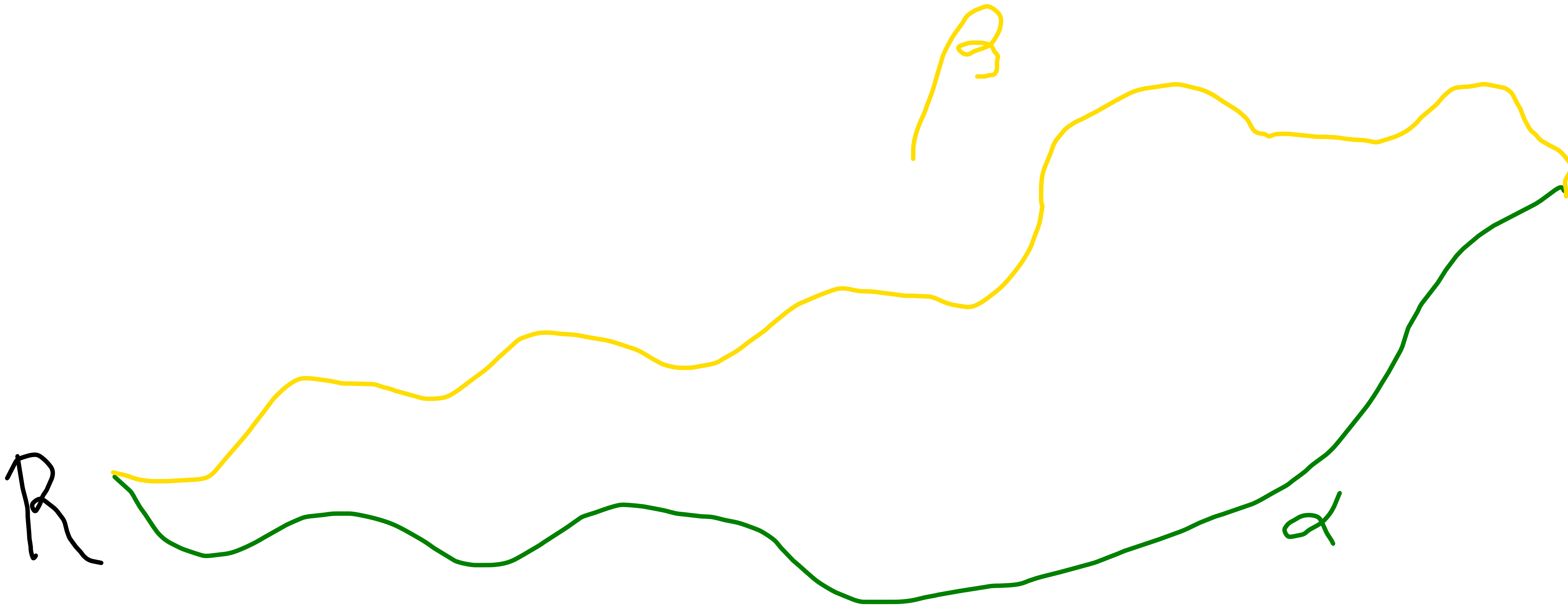
$$\underbrace{\left(\underbrace{\begin{pmatrix} a & b & c \\ e & f & g \end{pmatrix}}_{A} \begin{matrix} d \\ h \end{matrix}\right)}_{C}$$

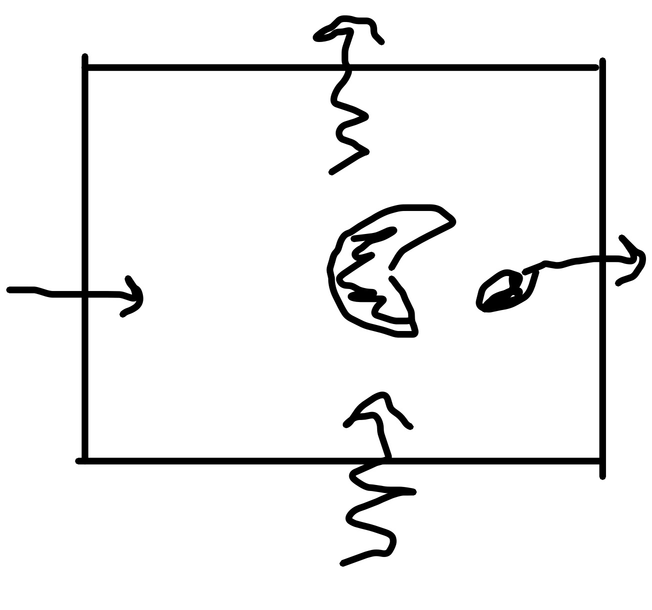
rango(A)	rango(C)	
1	1	$\pi_1 = \pi_2$
1	2	$\pi_1 \parallel \pi_2$
2	2	$\dim(\pi_1 \cap \pi_2) = 3 - 2 = 1$

$\mathbb{A}^4$



rango(A)	rango(C)	
2	2	$\pi_1 = \pi_2$
2	3	$\pi_1 \parallel \pi_2$
3	3	$\dim(\pi_1 \cap \pi_2) = 4-3 = 1$ una retta
3	4	π_1 e π_2 una direzione comune
4	4	$\dim(\pi_1 \cap \pi_2) = 4-4 = 0$ un punto

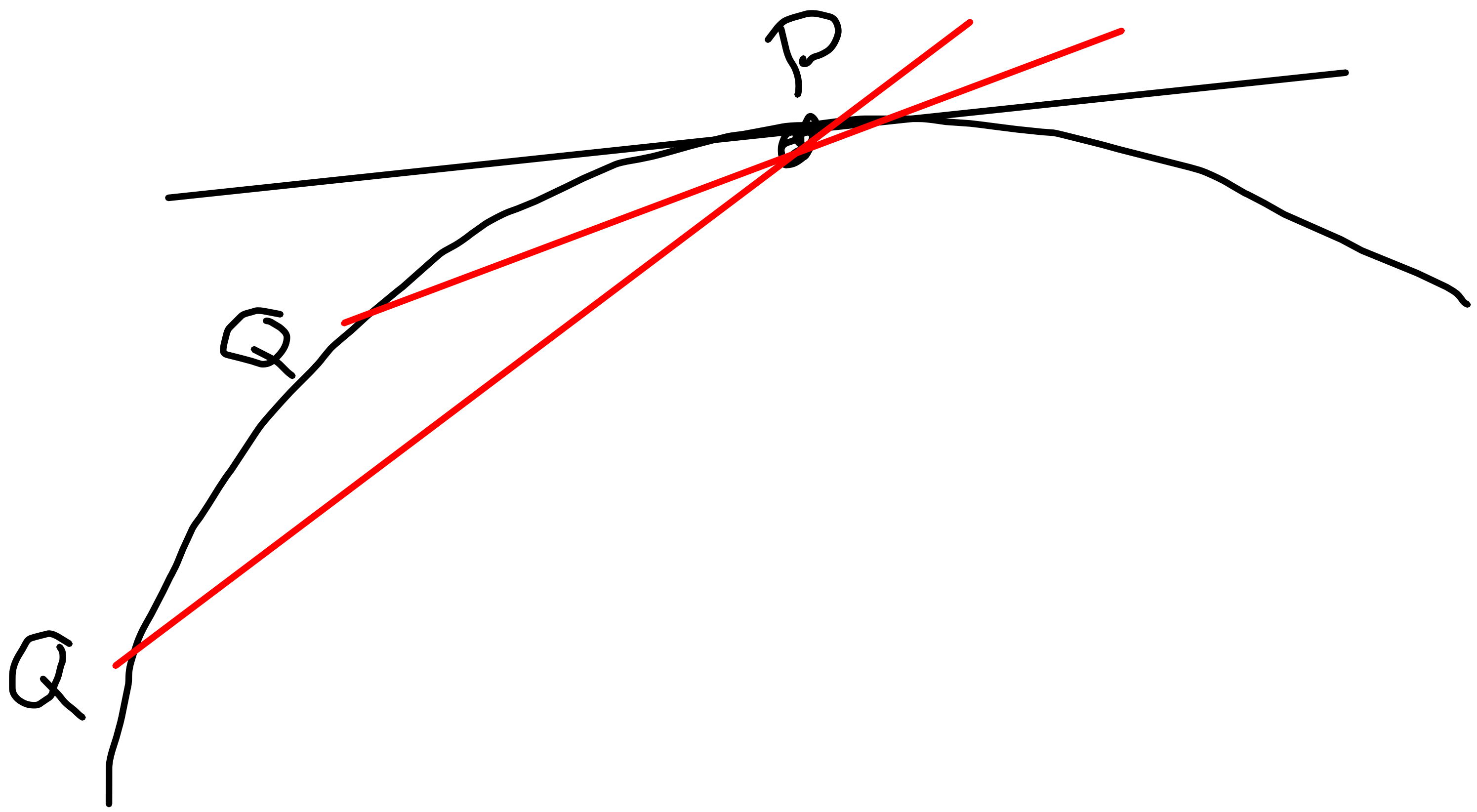

R
β
α



$x^2 - 6x + 9 = 0$ $\qquad$ $\cancel{x = 3}$ $\quad$ mult $= 2$

$-6.01 \quad + 8.96$ $\longrightarrow$ $x = 3.04 \quad x = 2.83$

$x - 3 = 0$ $\qquad$ $x = 3$ $\quad$ mult $= 1$



PROP - $f(x)$ polinomio a coefficienti reali
Le soluzioni di $f(x)=0$ sono o reali o coppie di numeri complessi coniugati.

$$ax^2+bx+c=0 \qquad x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$$

COR - $f(x,y)$, $g(x,y)$ polinomi a coeff. reali
Le soluzioni del sistema $\begin{cases} f(x,y)=0 \\ g(x,y)=0 \end{cases}$ sono

o coppie di numeri reali o coppie coniugate di coppie di numeri complessi

$$a_n x^n + a_{n-1} x^{n-1} + \cdots + a_1 x + a_0 = 0 \qquad \alpha_1, \ldots, \alpha_n \in \mathbb{C}$$

radici

$\in \mathbb{C}$

$$\left.\begin{aligned} &\alpha_1 + \cdots + \alpha_n = -\frac{a_{n-1}}{a_n} \\ &\alpha_1\alpha_2 + \cdots + \alpha_1\alpha_n + \alpha_2\alpha_3 + \cdots + \alpha_{n-1}\alpha_n = \frac{a_{n-2}}{a_n} \\ &\vdots \\ &\alpha_1\alpha_2 \cdots \alpha_n = (-1)^n \frac{a_0}{a_n} \end{aligned}\right\}$$

formule di Viète

Cerco il risultante di:

$$x^3 + (\alpha+1)x + 12 = 0 \qquad x^2 + \alpha = 0$$

$$\begin{array}{l|l}
x^3 + (\alpha+1)x + 12 & x^2+\alpha \\ \hline
-x^3 \quad - \alpha x & x \\ \hline
// \quad x + 12 &
\end{array}$$

$$\begin{array}{l|l}
x^2 + \alpha & x+12 \\ \hline
-x^2 - 12x & x-12 \\ \hline
// \quad -12x + \alpha & \\
\quad +12x + 144 & \\ \hline
// \quad \alpha + 144 &
\end{array}$$

risultante

Per $\alpha = -144$ le 2 eq.

hanno radice comune $x = -12$

$$x^3 + (\alpha+1)x + 12 = 0 \qquad x^2 + \alpha = 0$$

$$\begin{vmatrix} 1 & 0 & (\alpha+1) & 12 & 0 \\ 0 & 1 & 0 & (\alpha+1) & 12 \\ 1 & 0 & \alpha & 0 & 0 \\ 0 & 1 & 0 & \alpha & 0 \\ 0 & 0 & 1 & 0 & \alpha \end{vmatrix}$$