Es 12 Trovare il piano tang. in $\bar{P}=(3,9,0)$ a

$\Sigma: \underbrace{x^4-y^2-z^2}_{F(x,y,z)}=0$

	in $\bar{P}$
$F_x=4x^3$	108
$F_y=-2y$	-18
$F_z=-2z$	0

$\pi: 108(x-3)-18(y-9)+0(z-0)=0$

~~$\frac{x-3}{108}=\frac{y-9}{-18}=\frac{z-0}{0}$~~ $=\alpha$

normale a Σ in $\bar{P}$:

$$n: \begin{cases} x=108\alpha+3 \\ y=-18\alpha+9 \\ z=0 \end{cases}$$

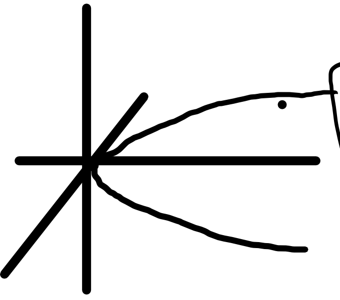
$$f(x,y)=0$$

Quel è l'insieme

$$\left\{ \begin{matrix} (x,y)\in\mathbb{R}^2 \\ (x,y,z)\in\mathbb{R}^3 \end{matrix} \;\middle|\; f(x,y)=0 \right\}$$

Es 10 $\quad C: \begin{cases} z = 0 \\ y = x^2 \end{cases}$

Sup. Σ_1 di rot. attorno all'asse y



$x^2 - y = 0$

$$\Sigma_1 : \left(\pm\sqrt{x^2+z^2}\right)^2 - y = 0 \qquad x^2 + z^2 - y = 0$$

Σ_2 di rotaz. attorno all'asse x

$x^2 - y = 0$

$$x^2 - \left(\pm\sqrt{y^2+z^2}\right) = 0$$

$$x^2 = \pm\sqrt{y^2+z^2} \qquad x^4 - y^2 - z^2 = 0$$

$C: \begin{cases} z=0 \\ y=x^2 \end{cases}$ Σ_3 di rotaz. attorno ad r: $\begin{cases} x=z & (l,m,n) \sim (1,0,1) \\ y=0 \end{cases}$

$\begin{cases} x=\alpha \\ y=\alpha^2 \\ z=0 \end{cases}$ $P_\alpha \equiv (\alpha, \alpha^2, 0)$ π_α piano per P_α, $\perp r$

π_α : $1(x-\alpha)+0(y-\alpha^2)+1(z-0)=0$

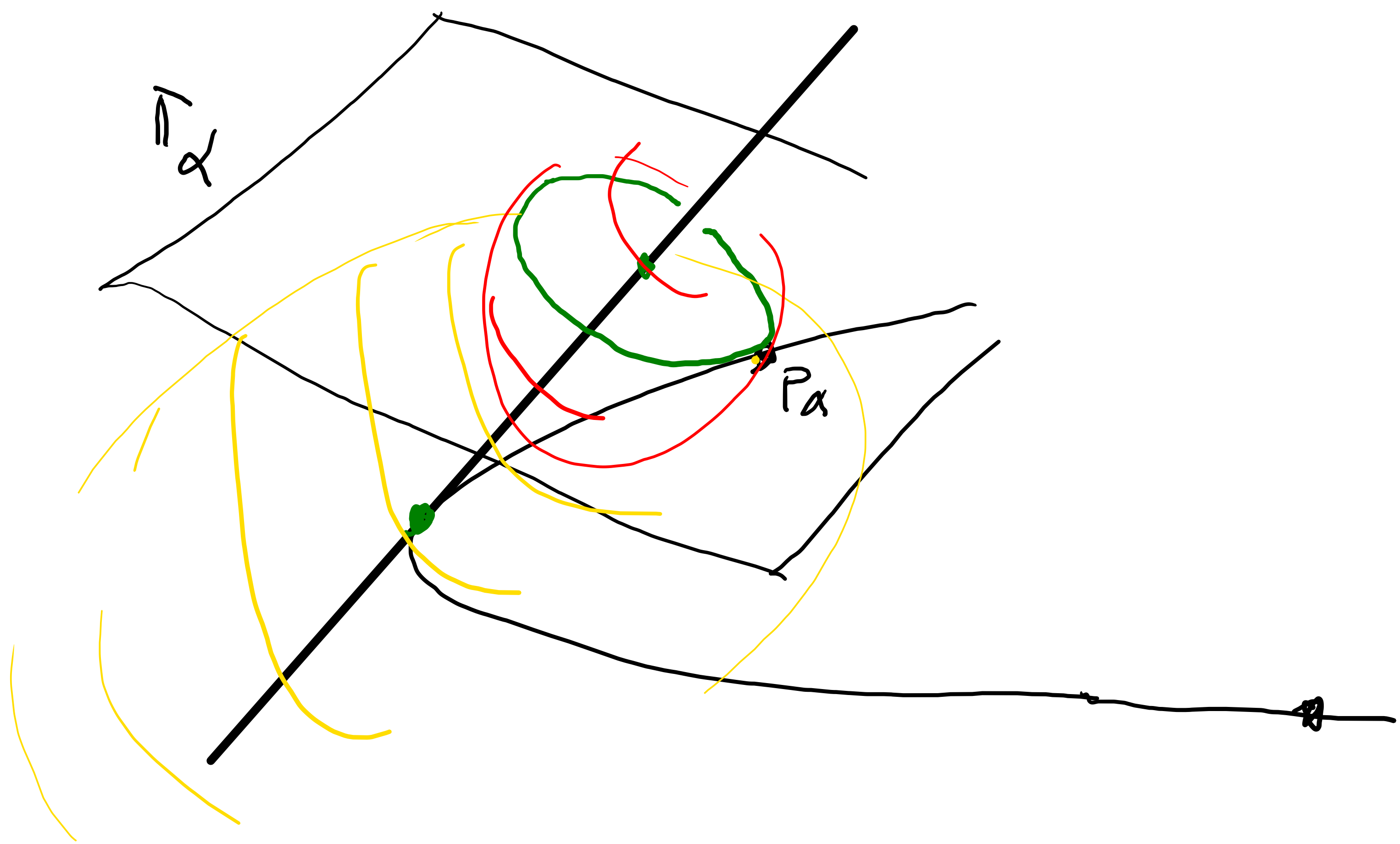
$x+z-\alpha=0$

S_α sfera per P_α con centro $O \equiv (0,0,0)$

$(x-0)^2+(y-0)^2+(z-0)^2=(\alpha-0)^2+(\alpha^2-0)^2+(0-0)^2$

$\Sigma_3: \begin{cases} x+z-\alpha=0 \\ x^2+y^2+z^2=\alpha^2+\alpha^4 \end{cases}$ $\Sigma_3: x^2+y^2+z^2-(x+z)^2-(x+z)^4=0$

$\alpha = x+z$


Γα
Pα

Σ_4 : ruoti di $\begin{cases} z=0 \\ y=x^2 \end{cases}$ attorno all'asse z $(l,m,n)=(0,0,1)$

$P_\alpha \equiv (\alpha, \alpha^2, 0)$

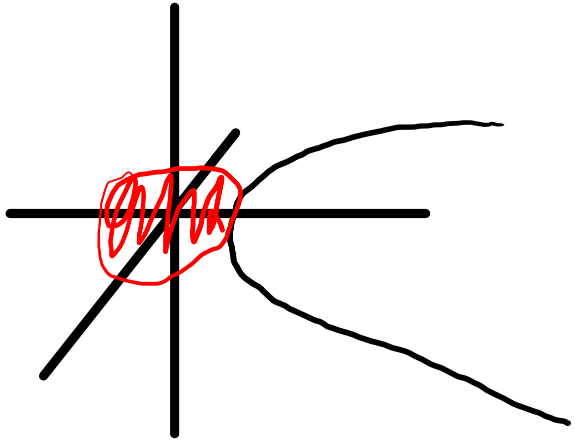
π'_α piano per $P_\alpha \perp$ asse z $\quad 0(x-\alpha)+0(y-\alpha^2)+1(z-0)=0$

$z=0$

S_α sfera per P_α con centro O

$\Sigma_4 : \begin{cases} z=0 \\ x^2+y^2+z^2=\alpha^2+\alpha^4 \end{cases} \longrightarrow \Sigma_4 : z=0$

ATTENZIONE: lo stesso risultato $z=0$ si ~~ott~~ tiene facendo ruotare attorno all'asse z anche la curva $\Gamma: \begin{cases} z=0 \\ y=x^2+1 \end{cases}$



$\mathcal{C}: \begin{cases} z=0 \\ y=x^2 \end{cases}$ Cono K avente $\mathcal{C}$ come direttrice e Vertice $V\equiv(0,0,1)$

$P_\alpha\equiv(\alpha,\alpha^2,0)$ retta r_α per V e P_α

$$r_\alpha: \frac{x-0}{\alpha-0}=\frac{y-0}{\alpha^2-0}=\frac{z-1}{0-1} \qquad \frac{x}{\alpha}=\frac{y}{\alpha^2}=\frac{z-1}{-1}=\beta$$

$$\begin{cases} x=\alpha\beta \\ y=\alpha^2\beta \\ z=-\beta+1 \end{cases} \qquad \begin{cases} x=\alpha\beta \\ y=\alpha^2\beta \\ \beta=1-z \end{cases} \qquad \begin{cases} x=\alpha(1-z) \\ y=\alpha^2(1-z) \end{cases}$$

$$\begin{cases} \alpha=\frac{x}{1-z} \\ y=\alpha^2(1-z) \end{cases} \qquad y=\frac{x^2}{(1-z)^{\cancel{2}}}\cancel{(1-z)} \qquad y(1-z)=x^2$$

Cilindro L con direttrice $\begin{cases} z=0 \\ y=x^2 \end{cases}$ e generatrici

$\parallel (t): \begin{cases} x=2y \\ z=y-1 \end{cases}$ $\quad \begin{cases} x=2\gamma \\ y=\gamma \\ z=\gamma-1 \end{cases}$ $\quad (l,m,n) \sim (2,1,1)$

retta s_α per $P_\alpha \equiv (\alpha, \alpha^2, 0) \parallel t$

$$s_\alpha: \frac{x-\alpha}{2} = \frac{y-\alpha^2}{1} = \frac{z-0}{1} = \beta$$

$$L: \begin{cases} x=\alpha+2\beta \\ y=\alpha^2+\beta \\ z=\beta \end{cases} \quad \begin{cases} x= \\ y= \\ \beta=z \end{cases} \quad \begin{cases} x=\alpha+2z \\ y=\alpha^2+z \end{cases} \quad \begin{cases} \alpha=x-2z \\ y=\alpha^2+z \end{cases}$$

$$y=(x-2z)^2+z$$