Es 12

$\Sigma : f(x,y,z) = x^4 - y^2 - z^2 = 0$

$P = (3, 9, 0)$

trovare il piano tang.

a Σ in P in P

$f_x = 4x^3$ 108

$f_y = -2y$ -18

$f_z = -2z$ 0

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

Es 10

$$\mathcal{C} : \begin{cases} z = 0 \\ y = x^2 \end{cases} \qquad \begin{cases} x = \alpha \\ y = \alpha^2 \\ z = 0 \end{cases}$$

Cono Σ di dir. $\mathcal{C}$ e vertice $V \equiv (0,0,1)$

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

retta r_α per V e P_α

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

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

$$\Sigma : \begin{cases} x = \alpha\beta \\ y = \alpha^2\beta \\ z = -\beta+1 \end{cases}$$

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

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

$$y = \frac{x^2}{(1-z)^{\not 2}} \, \cancel{(1-z)}$$

$$(1-z)y - x^2 = 0$$

$$y - yz - x^2 = 0$$

Cilindro di diret=trice C e genera=trici $\parallel$ s: $\begin{cases} x = 2y \\ z = y-1 \end{cases}$

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

Retta s_α per $P_\alpha \equiv (\alpha, \alpha^2, 0)$

e $\parallel s$:

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

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

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

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

Sup. di rot. di C attorno all'asse y:

$$C : \begin{cases} y = x^2 \\ z = 0 \end{cases} \qquad y = \left(\pm\sqrt{x^2 + z^2}\right)^2$$

$$y = x^2 + z^2$$

Sup. di rot. di ℓ attorno all'asse x:

$$\ell : \begin{cases} y = x^2 \\ z = 0 \end{cases}$$

$$\pm\sqrt{y^2+z^2} = x^2$$

$$y^2 + z^2 - x^4 = 0$$

Sup. di rot. di ℓ attorno a r: $\begin{cases} x = z \\ y = 0 \end{cases}$ $\begin{cases} x = \gamma \\ y = 0 \\ z = \gamma \end{cases}$ $(l, m, n) \sim (1, 0, 1)$

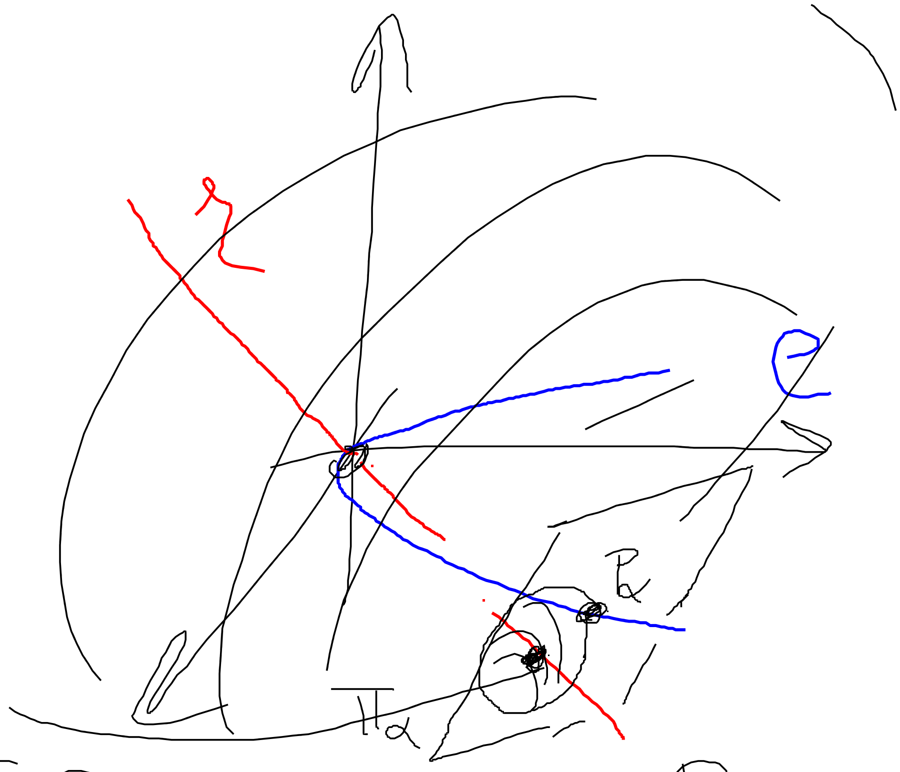
$P_\alpha \equiv (\alpha, \alpha^2, 0)$

Cerco la circonf per P_α e con centro su r

Piano π_α per P_α, $\perp r$

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

$$x + z - \alpha = 0$$



Sfera S_α per P_α e con centro in (α,α,α)

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

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

$$x^2+y^2+z^2=(x+z)^2+(x+z)^4$$

Sup. di rot. di $\mathcal{C}$ attorno all'asse z:

Sfera per $P_\alpha = (\alpha, \alpha^2, 0)$ e con centro sull'asse z. Prendo centro $(0,0,0)$

$S_\alpha : x^2 + y^2 + z^2 = \alpha^2 + \alpha^4$

Piano Π_α per P_α, $\perp$ asse z:

$\Pi_\alpha : z = 0 \quad \forall \alpha$ $\equiv (\alpha, \alpha^2, 0)$

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

$z = 0$