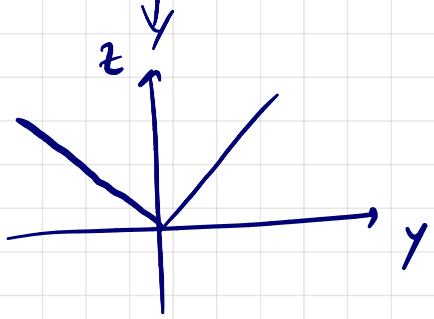
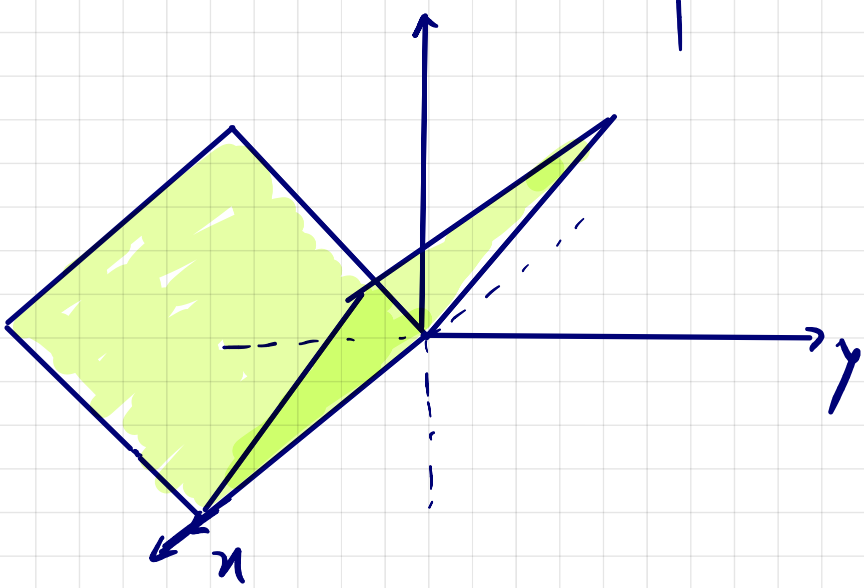
LISTA 07

14/09/23

06) (b) $y = |z|$ (no plano yz)

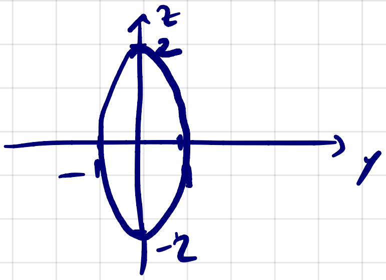
↳ logo, a superfície terá "profundidade" no eixo x.



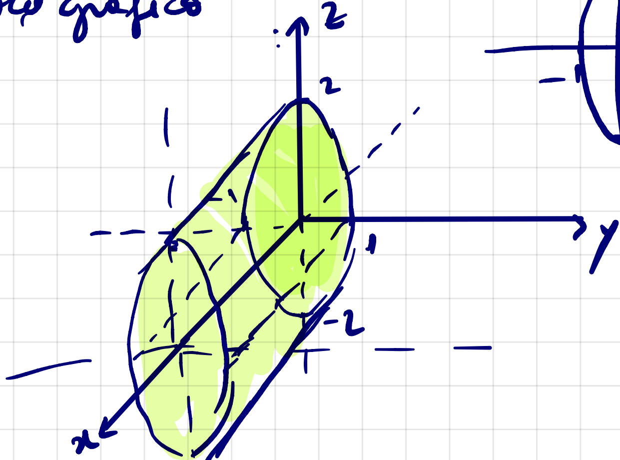


(e) $y^2 + \frac{z^2}{4} = 1$

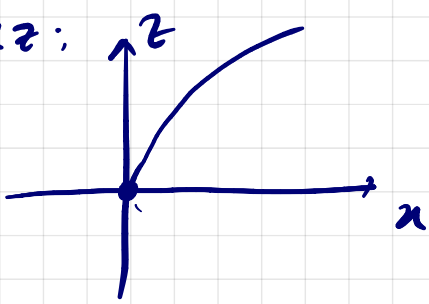
no plano yz temos o traço de uma elipse.

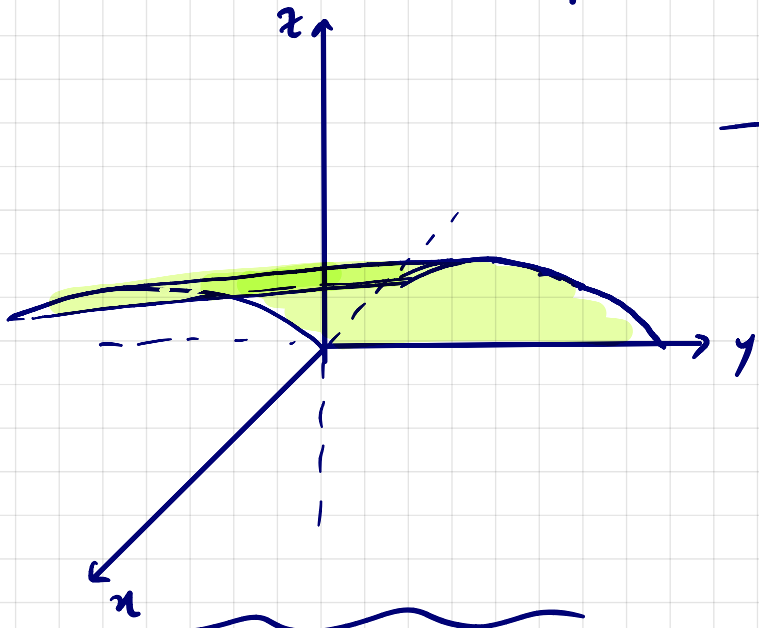


esboço gráfico



g) $x = \sqrt{z}$ $\rightarrow$ no plano xz:





LISTA 07

05) OBTER, EM COORD. ESFÉRICAS, A EQUAÇÃO DADA POR:

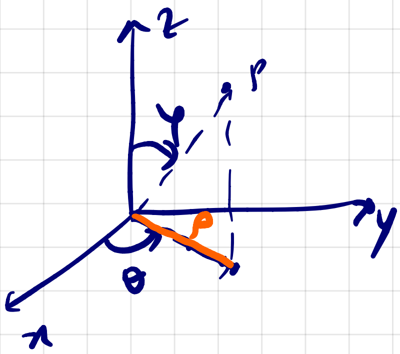
$$x^2 + y^2 + 4z^2 = 4.$$

$$\begin{cases} x = \rho \cos\theta \cdot \operatorname{sen}\varphi \\ y = \rho \cdot \operatorname{sen}\theta \cdot \operatorname{sen}\varphi \\ z = \rho \cos\varphi \end{cases}$$

$$\boxed{x^2 + y^2 + z^2 = \rho^2} \quad (*)$$

$0 \leq \theta \leq 2\pi$

$0 \leq \varphi \leq \pi$



Efetuando a mudança, obtemos:

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

$$\underbrace{x^2 + y^2 + z^2}_{\substack{\rho^2, \\ \text{por } (*)}} + 3z^2 = 4$$

$$\rho^2 + 3z^2 = 4 \qquad z = \rho\cos\varphi$$

$$\rho^2 + 3 \cdot (\rho\cos\varphi)^2 = 4 \implies \rho^2 + 3 \cdot \rho^2 \cdot \cos^2\varphi = 4$$

$$\boxed{\rho^2(1+3\cos^2\varphi)=4}$$

LISTA 07

07 (b) $4x^2+9y^2-z^2=36 \quad (\div 36)$

$$\frac{4x^2}{36}+\frac{9y^2}{36}-\frac{z^2}{36}=1$$

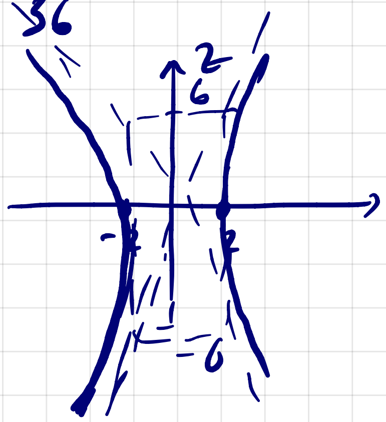
$$\frac{x^2}{9}+\frac{y^2}{4}-\frac{z^2}{36}=1$$

(HIPERBOLÓIDE DE UMA FOLHA)

traços: • $x=0$. (plano yz):

$$\frac{y^2}{4}-\frac{z^2}{36}=1$$

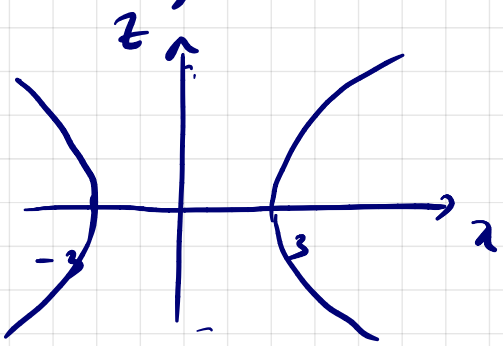
(hipérbole)
↳ com eixo real sendo o eixo y.



• $y=0$: (plano xz):

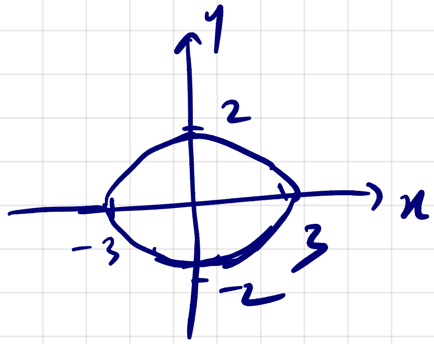
$$\frac{x^2}{9}-\frac{z^2}{36}=1$$

(hipérbole)
↳ com eixo real sendo o eixo z.

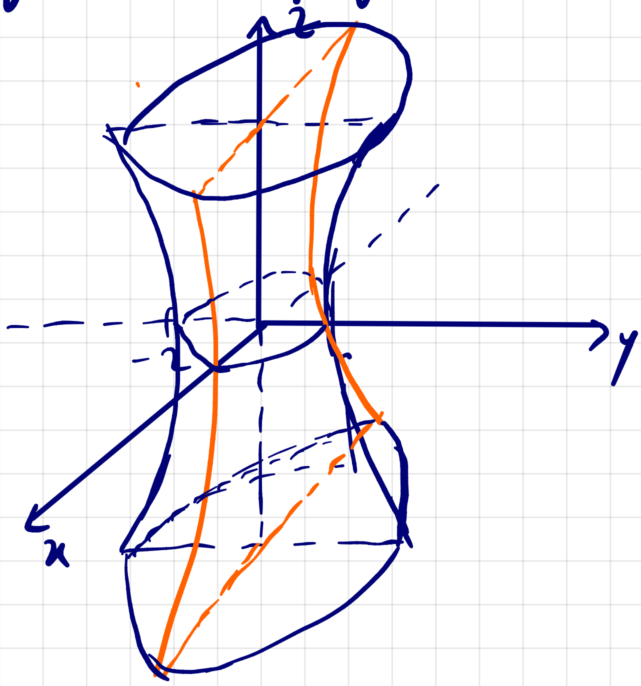


• $z=0$ (plano xy):

$$\frac{x^2}{9}+\frac{y^2}{4}=1 \qquad \text{(elipse)}$$



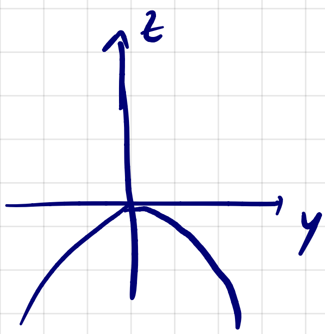
esboço gráfico da superfície:



(d) $\frac{x^2}{36}-\frac{z^2}{25}=9y$

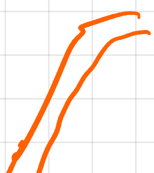
traços: • $x=0$: (plano yz)

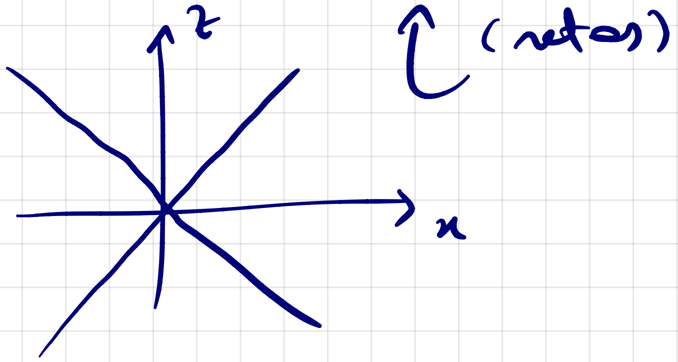
$$-\frac{z^2}{25}=9y$$



• $y=0$ (plano xz)

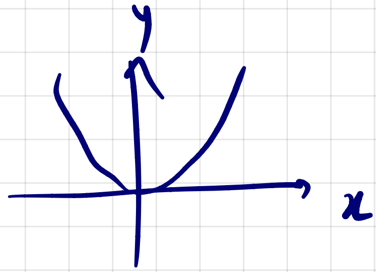
$$\frac{x^2}{36}-\frac{z^2}{25}=0 \Rightarrow \left(\frac{x}{6}-\frac{z}{5}\right)\left(\frac{x}{6}+\frac{z}{5}\right)=0$$





• $z=0$: (plano xy)

$9y = \frac{x^2}{36}$

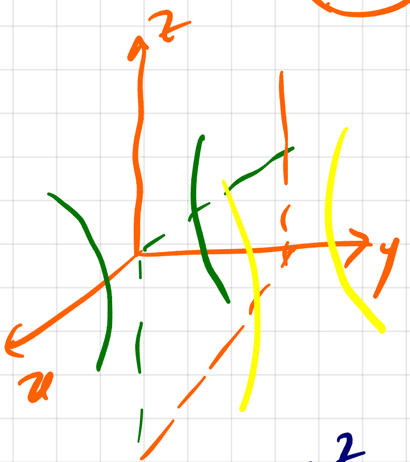


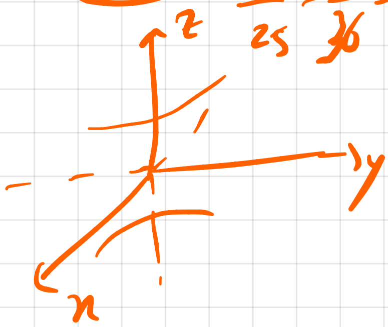
$y = K$ (CONSTANTE)

$\frac{x^2}{36} - \frac{z^2}{25} = 9K$ $K>0$ (HIPÉRBOLES)

EIXO REAL

$K<0$ $\frac{z^2}{25} - \frac{x^2}{36} = \dots$

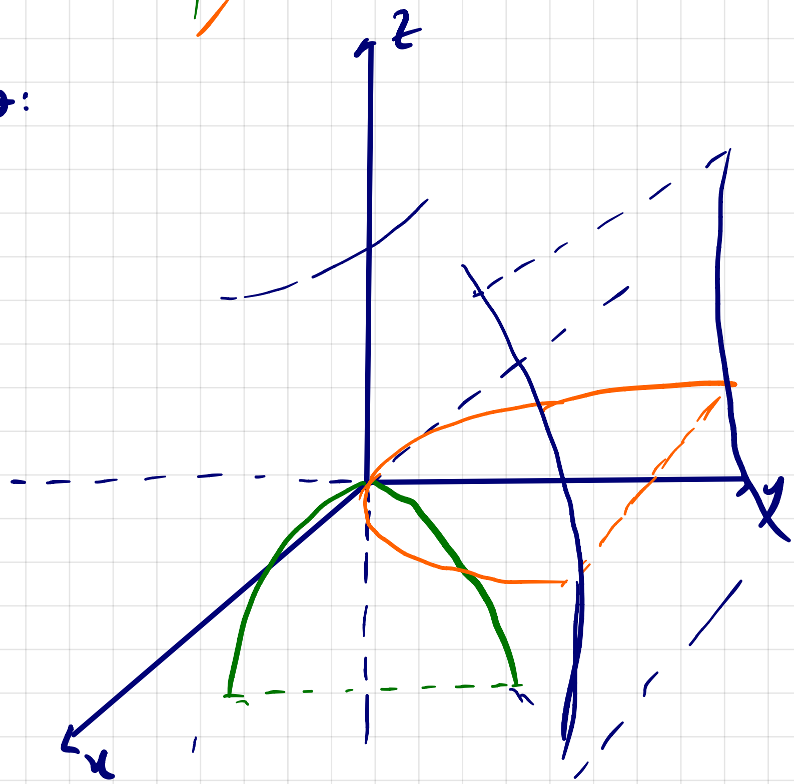




PARABOLÓIDE HIPERBÓLICO

esboço gráfico:

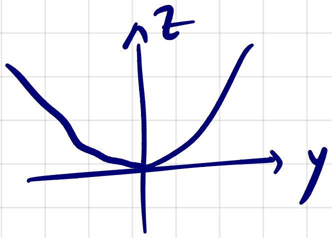
?



(f) $\dfrac{y^2}{25} + \dfrac{x^2}{36} = 4z$

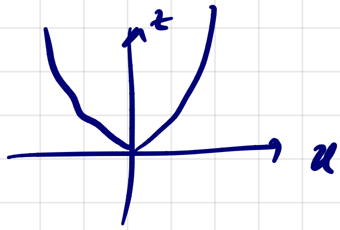
traços: • $x = 0$: (plano yz)

$$\frac{y^2}{25} = 4z \quad \text{(parábola)}$$



• $y = 0$: (plano xz):

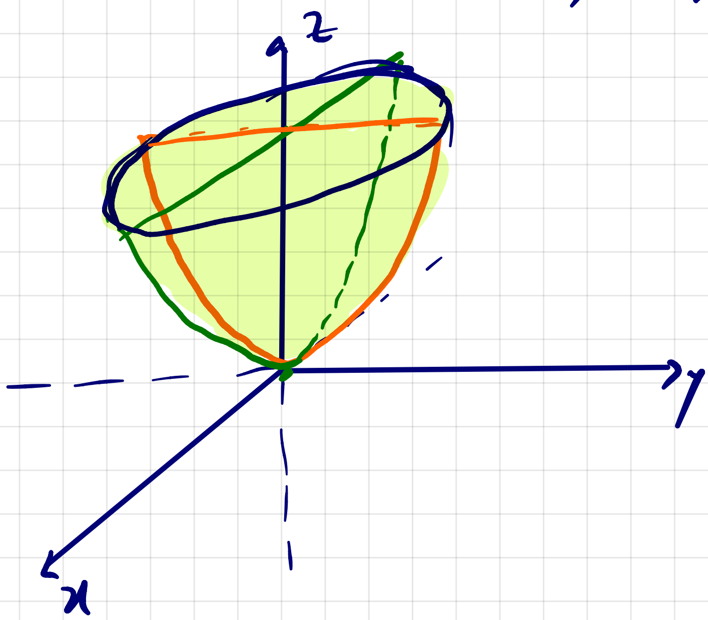
$$\frac{x^2}{36} = 4z \quad \text{(parábola)}$$



• $z = 0$: (plano xy)

$$\frac{y^2}{25} + \frac{x^2}{36} = 0 \iff x = y = 0$$

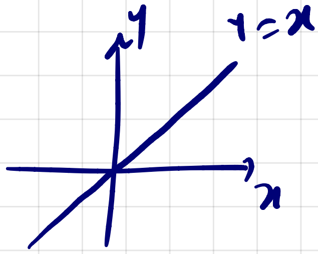
(origem)

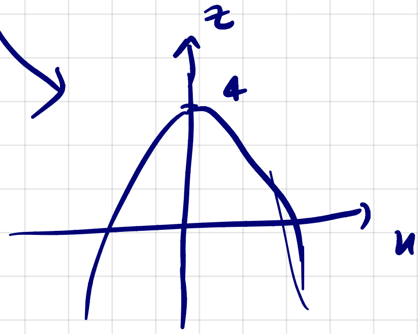


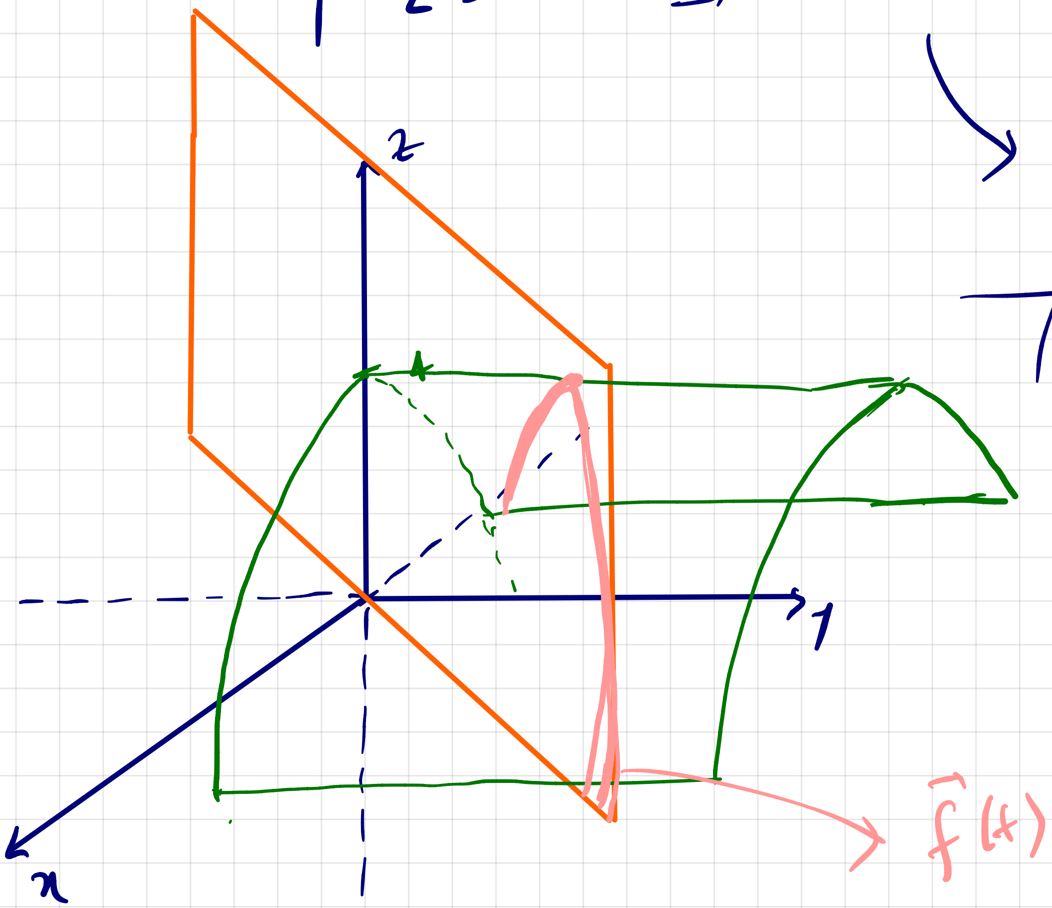
LISTA 08 :

01) (a) $\vec{f}(t) = (\underbrace{t}_{x}, \underbrace{t}_{y}, \underbrace{4-t^2}_{z})$

$$\left\{\begin{array}{l} x = t \\ y = t \\ z = 4 - t^2 \end{array}\right. \qquad \begin{array}{l} x = y \\ \Rightarrow z = 4 - x^2 \end{array}$$







(b) $\vec{f}(t) = \underbrace{2\cos t}_{x}\,\vec{i} + \underbrace{2 \cdot \text{sen}\,t}_{y}\,\vec{j} + \underbrace{2}_{z}\vec{k}$.

$$\left\{\begin{array}{l} x = 2\cos t \\ y = 2\,\text{sen}\,t \\ \boxed{z = 2} \end{array}\right. \qquad \begin{array}{l} \dfrac{x}{2} = \cos t \\ \dfrac{y}{2} = \text{sen}\,t \end{array}$$

$\operatorname{sen}^2 t + \cos^2 t = 1$

$\dfrac{x^2}{4} + \dfrac{y^2}{4} = 1 \iff x^2 + y^2 = 4$

circunf.