

ESFERA

Cartesianas

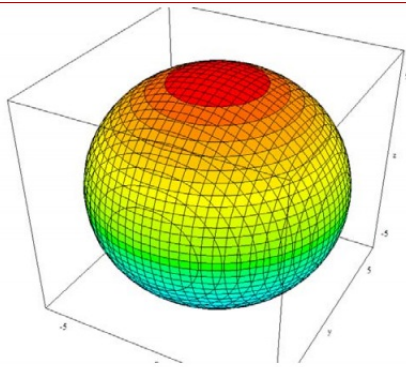
$$x^2 + y^2 + z^2 = r^2$$

Paramétricas

$$\begin{aligned} x &= r \sen u \cos v & u \in [0, \pi] \\ y &= r \sen u \sen v & v \in [0, 2\pi] \\ z &= r \cos u \end{aligned}$$

ó también

$$\phi(u, v) = (\cos u \cos v, \cos u \sen v, \sen u) \quad \begin{aligned} u \in [-\pi/2, \pi/2] & \quad v \in [0, 2\pi] \\ 0 \leq u \leq \pi, & \quad 0 \leq v \leq 2\pi \end{aligned}$$



$$\begin{cases} x = 5 \sen u \cos v \\ y = 5 \sen u \sen v \\ z = 5 \cos u \end{cases} \quad \begin{aligned} 0 \leq u \leq \pi, & \quad 0 \leq v \leq 2\pi \end{aligned}$$

ELIPSOIDE

Cartesianas

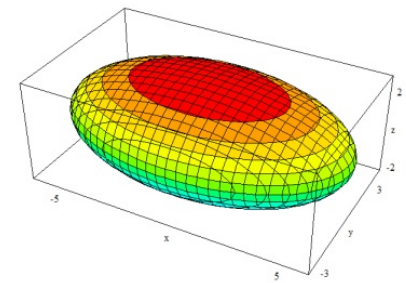
$$\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1$$

Paramétricas

$$\begin{aligned} x &= a \sen u \cos v & u \in [0, \pi] \\ y &= b \sen u \sen v & v \in [0, 2\pi] \\ z &= c \cos u \end{aligned} \quad \begin{cases} x = 5 \sen u \cos v \\ y = 3 \sen u \sen v \\ z = 2 \cos u \end{cases} \quad \begin{aligned} 0 \leq u \leq \pi, & \quad 0 \leq v \leq 2\pi \end{aligned}$$

ó también:

$$\begin{aligned} \phi(\varphi, t) &= (a \cos \varphi \cos t, b \cos \varphi \sen t, c \sen \varphi) \\ \varphi &\in [-\pi/2, \pi/2] \\ t &\in [0, 2\pi] \end{aligned}$$



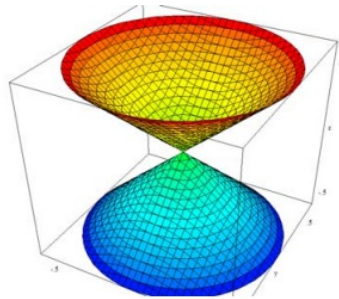
CONO

Cartesianas

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

Paramétricas

$$\begin{cases} x = u \cos v \\ y = u \sen v \\ z = u \end{cases} \quad 0 \leq v \leq 2\pi, u \in I$$



HIPERBOLOIDE DE

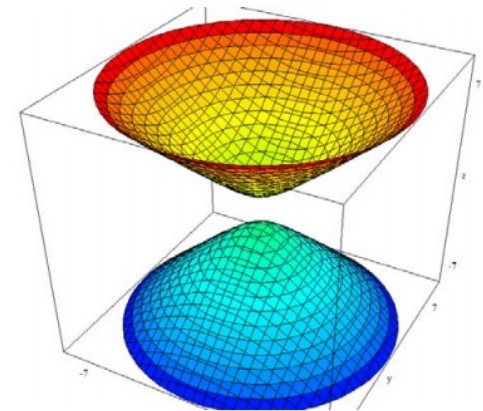
DOS HOJAS

Cartesianas

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} - \frac{z^2}{c^2} = -1$$

Paramétricas

$$\begin{cases} x = a \senh u \cos v \\ y = b \senh u \sen v \\ z = c \cosh u \end{cases}$$



$$\begin{cases} x = \senh u \cos v \\ y = \senh u \sen v \\ z = \cosh u \end{cases} \quad -\infty < u < \infty, \quad 0 \leq v \leq 2\pi$$

CILINDRO ELÍPTICO

Cartesianas

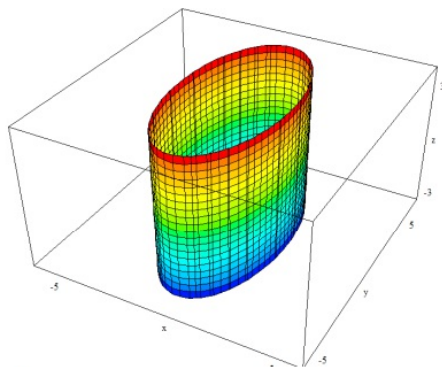
$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$$

Paramétricas

$$x = a \cos u$$

$$y = b \sin u$$

$$z = v$$



$$\begin{cases} x = 2 \cos u \\ y = 4 \sin u \\ z = v \end{cases} \quad 0 \leq u < 2\pi, \quad v \in I$$

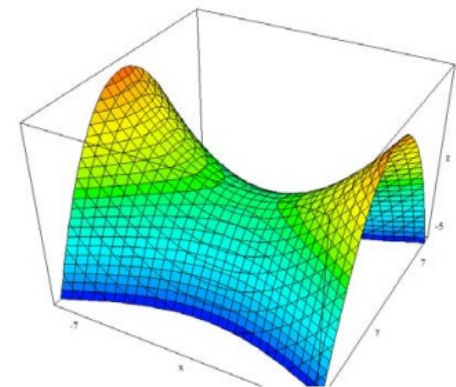
PARABOLOIDE HIPERBÓLICO

Cartesianas

$$z = \pm \left(\frac{x^2}{a^2} - \frac{y^2}{b^2} \right)$$

Paramétricas

$$\begin{cases} x = au \cosh v \\ y = bu \sinh v \\ z = \pm u^2 \end{cases}$$



$$\begin{cases} x = 3u \cosh v \\ y = 2u \sinh v \\ z = u^2 \end{cases} \quad u \in I, \quad v \in J$$

PARABOLOIDE ELIPTICO

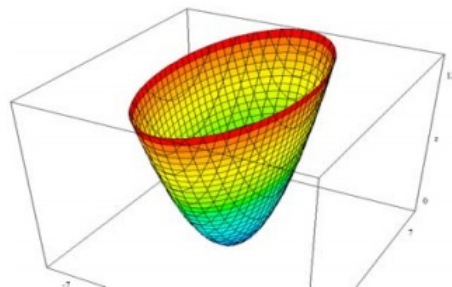
Cartesianas

$$z = x^2 + y^2 \text{ (circular)}$$

$$z = ax^2 + by^2 \text{ (elíptico)}$$

Paramétricas

$$\begin{cases} x = au \cos v \\ y = bu \sin v \\ z = \pm u^2 \end{cases}$$



$$\begin{cases} x = u \cos v \\ y = 2u \sin v \\ z = u^2 \end{cases} \quad u \in I, \quad 0 \leq v < 2\pi$$

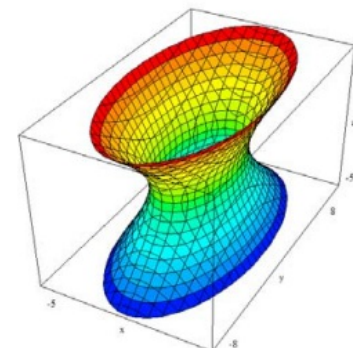
HIPERBOLOIDE DE UNA HOJA

Cartesianas

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} - \frac{z^2}{c^2} = 1$$

Paramétricas

$$\begin{cases} x = a \cosh u \cos v \\ y = b \cosh u \sin v \\ z = c \sinh u \end{cases}$$



$$\begin{cases} x = 2 \cosh u \cos v \\ y = 4 \cosh u \sin v \\ z = 3 \sinh u \end{cases} \quad -\infty < u < \infty, \quad 0 \leq v \leq 2\pi$$