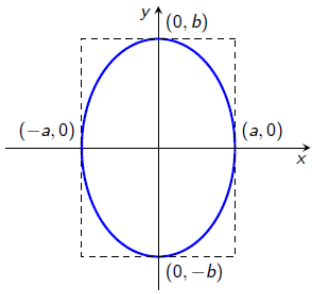
Equações reduzidas : Cónicas ($\mathbb{R}^2$)

Elipse

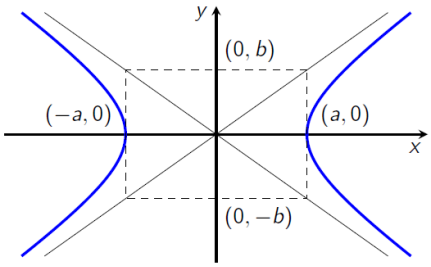
$$\begin{bmatrix} x & y \end{bmatrix} \begin{bmatrix} 1/a^2 & 0 \\ 0 & 1/b^2 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = 1 \Leftrightarrow \frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$$



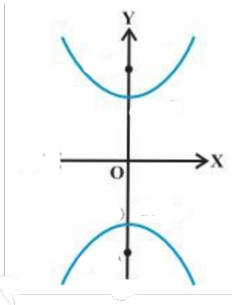
Nota: Se $a = b\,(=$ raio$)$ temos uma circunferência.

Hipérbole

$$\begin{bmatrix} x & y \end{bmatrix} \begin{bmatrix} 1/a^2 & 0 \\ 0 & -1/b^2 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = 1 \Leftrightarrow \frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$$



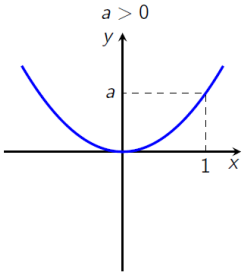
$$\begin{bmatrix} x & y \end{bmatrix} \begin{bmatrix} -1/a^2 & 0 \\ 0 & 1/b^2 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = 1 \Leftrightarrow -\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$$

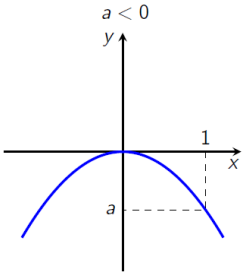


Parábola

$$\begin{bmatrix} x & y \end{bmatrix} \begin{bmatrix} a & 0 \\ 0 & 0 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} + \begin{bmatrix} 0 & -1 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = 0$$

$$\Leftrightarrow y = ax^2$$

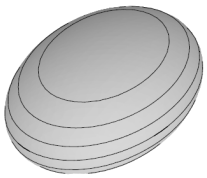




Equações reduzidas : Quádricas ($\mathbb{R}^3$)

Elipsóide

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

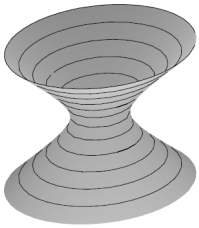


Nota: Se $a=b=c$ temos uma esfera.

Hiperbolóides

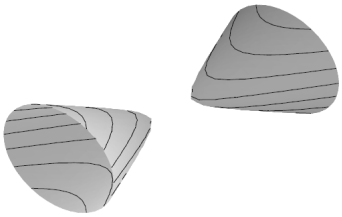
Hiperbolóide de uma folha

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



Hiperbolóide de duas folhas

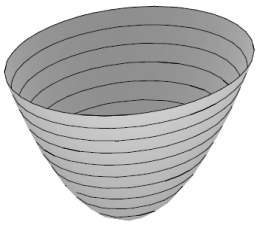
$$\frac{x^2}{a^2}-\frac{y^2}{b^2}-\frac{z^2}{c^2}=1$$



Parabolóides

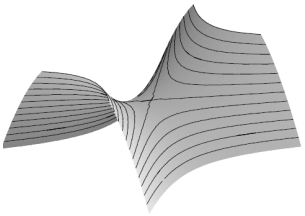
Parabolóide elíptico

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



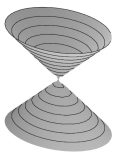
Parabolóide hiperbólico

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

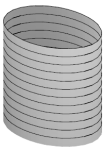


Quádricas degeneradas

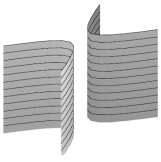
Cone $\frac{x^2}{a^2}+\frac{y^2}{b^2}-\frac{z^2}{c^2}=0$



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



Cilindro hiperbólico $\frac{x^2}{a^2}-\frac{y^2}{b^2}=1$



Cilindro Parabólico $y=ax^2$