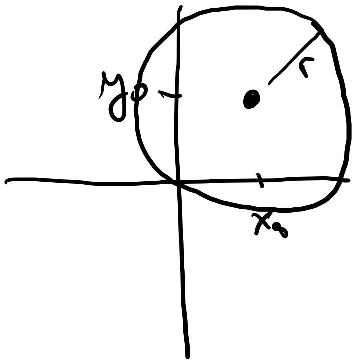
PARAMETRIZACIÓN DE CIRCUNFERENCIA Y ELIPSE

Ec circunferencia

$$(x-x_0)^2+(y-y_0)^2=r^2$$

x, y son variables

$x_0, y_0, r>0 \in \mathbb{R}$ son fijos



$$\frac{(x-x_0)^2}{r^2}+\frac{(y-y_0)^2}{r^2}=1$$

$$\left(\frac{x-x_0}{r}\right)^2+\left(\frac{y-y_0}{r}\right)^2=1$$

Recuerdo $\cos^2(\theta)+\operatorname{sen}^2(\theta)=1$

considero

$\cos(t)=\dfrac{x-x_0}{r} \rightsquigarrow r\cos(t)+x_0=x$

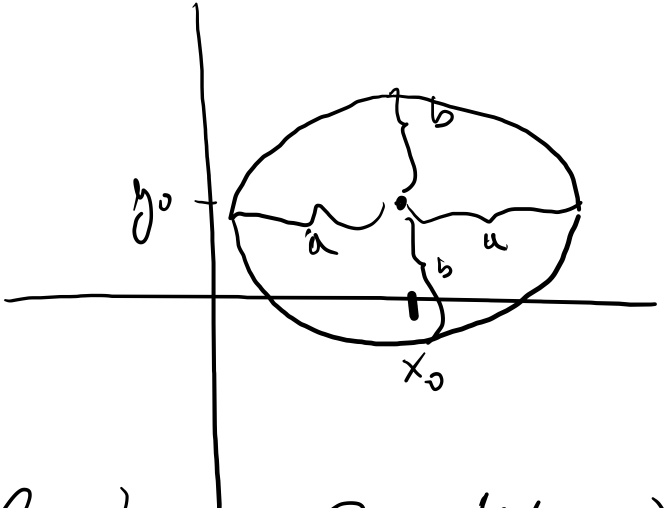
$\operatorname{sen}(t)=\dfrac{y-y_0}{r} \rightsquigarrow r\operatorname{sen}(t)+y_0=y$

$$\sigma(t)=(x(t),y(t))$$

$$\sigma(t)=(r\cos(t)+x_0,\ r\operatorname{sen}(t)+y_0),\ t\in[0,2\pi)$$

Ec. Elipse

$$\left(\frac{x-x_0}{a}\right)^2+\left(\frac{y-y_0}{b}\right)^2=1$$



Recuerdo

$$\cos^2(\theta)+\operatorname{sen}^2(\theta)=1$$

Considero

$$\cos(t)=\frac{x-x_0}{a} \rightsquigarrow a\cos(t)+x_0=x$$

$$\operatorname{sen}(t)=\frac{y-y_0}{b} \rightsquigarrow b\operatorname{sen}(t)+y_0=y$$

$$\sigma(t)=(x(t),y(t))$$

$$\sigma(t)=(a\cos(t)+x_0,\ b\operatorname{sen}(t)+y_0),\ t\in[0,2\pi]$$

$$\mathcal{C}=\{(x,y)\in\mathbb{R}:4(x-1)^2+9y^2=25\}$$

$$4(x-1)^2+9y^2=25 \iff 2^2(x-1)^2+3^2y^2=5^2 \iff \frac{2^2(x-1)^2}{5^2}+\frac{3^2y^2}{5^2}=1$$

$$\frac{2^2(x-1)^2}{5^2} + \frac{3^2 y^2}{5^2} = 1$$

$$\boxed{\frac{(x-1)^2}{\frac{5^2}{2^2}} + \frac{y^2}{\frac{5^2}{3^2}} = 1}$$

$$\underbrace{\left(\frac{x-1}{\frac{5}{2}}\right)^2 + \left(\frac{y}{\frac{5}{3}}\right)^2 = 1}_{\text{ec. elipse}}$$

a b

Parametrización de una elipse

$$\sigma(t) = (a\cos(t) + x_0,\ b\,\mathrm{sen}(t) + y_0)$$

$$\sigma(t) = \left(\frac{5}{2}\cos(t) + 1,\ \frac{5}{3}\mathrm{sen}(t)\right),\ t \in [0, 2\pi)$$