Exemplo:

$$x^2 + 24xy - 6y^2 - 16x - 12y - 20 = 0$$

Escolhemos:

$$\operatorname{sen} 2\theta = \frac{|B|}{H}, \qquad \cos 2\theta = \operatorname{sign}\left(\frac{A-C}{B}\right)\frac{|A-C|}{H}$$

$$\text{com} \quad H = \sqrt{B^2 + (A-C)^2}$$

24 $\qquad A - C = 1 - (-6) = 7$

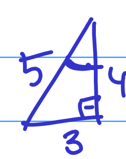
$$\boxed{\begin{array}{ll} 2c^2 - 1 = \operatorname{sign}\left(\frac{A-C}{B}\right)\frac{|A-C|}{H}, & \text{com } c > 0 \\ s^2 + c^2 = 1 & \text{com } s > 0 \end{array}}$$

$$H = \sqrt{24^2 + 7^2} = \sqrt{625} = 25$$

$$\cos 2\theta = \overbrace{\operatorname{sign}\left(\frac{7}{24}\right)}^{+1} \cdot \frac{|7|}{25} = \frac{7}{25}$$

$$2c^2 - 1 = \frac{7}{25} \Rightarrow 2c^2 = 1 + \frac{7}{25} = \frac{32}{25} \Rightarrow c^2 = \frac{16}{25} \Rightarrow$$

$$\Rightarrow c = \cos\theta = \frac{4}{5}$$



$$s = \operatorname{sen}\theta, \qquad s^2 + c^2 = 1, \qquad s^2 + \left(\frac{4}{5}\right)^2 = 1$$

$$s = \frac{3}{5}$$

$$c = \frac{4}{5}$$

$$\begin{cases} A' = A c^2 + B c s + C s^2 \\ B' = 0 \\ C' = A s^2 - B c s + C c^2 \\ D' = D c + E s \\ E' = -D s + E c \\ F' = F \end{cases}$$

$c = \frac{4}{5} \quad s = \frac{3}{5}$

$c^2 = \frac{16}{25} \quad s^2 = \frac{9}{25}$

$A = 1, \; B = 24, \; C = -6$

$D = -16, \; E = -12, \; F = -20$

$$A' = 1 \cdot \frac{16}{25} + 24 \cdot \frac{4}{5} \cdot \frac{3}{5} - 6 \cdot \frac{9}{25} = \frac{250}{25} = 10$$

$$B' = 0$$

$$C' = 1 \cdot \frac{9}{25} - 24 \cdot \frac{4}{5} \cdot \frac{3}{5} - 6 \cdot \frac{16}{25} = -\frac{375}{25} = -15$$

$$D' = -16 \cdot \frac{4}{5} - 12 \cdot \frac{3}{5} = -\frac{100}{5} = -20$$

$$E' = 16 \cdot \frac{3}{5} - 12 \cdot \frac{4}{5} = \frac{0}{5} = 0$$

$$F' = -20$$

$$10x'^2 - 15y'^2 - 20x' - 20 = 0$$

$$2x'^2 - 3y'^2 - 4x' - 4 = 0$$

$$2x'^2 - 4x' = 2(x'^2 - 2x' \cdot 1 + 1 - 1) = 2\left((x'-1)^2 - 1\right)$$

$$= 2(x'-1)^2 - 2$$

$$2(x'-1)^2 - 2 - 3y'^2 - 4 = 0$$

$$2(x'-1)^2 - 3y'^2 = 6$$

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

$$\begin{cases} x'' = x' - 1 \\ y'' = y' \end{cases} \Rightarrow \frac{x''^2}{3} - \frac{y'^2}{2} = 1$$

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

$$a = \sqrt{3} \quad , \quad b = \sqrt{2}$$