CURVE DI EQUAZIONE $y = a\,\text{sen}\,x + b\cos x$ $(a, b \in \mathbb{R}_0)$

$$\boxed{y = a\,\text{sen}\,x + b\cos x}$$

- moltiplico e divido per $\sqrt{a^2+b^2}$:

$$y = \sqrt{a^2+b^2}\left(\frac{a}{\sqrt{a^2+b^2}}\,\text{sen}\,x + \frac{b}{\sqrt{a^2+b^2}}\cos x\right)$$

$$-1 \le \frac{a}{\sqrt{a^2+b^2}} \le 1 \qquad -1 \le \frac{b}{\sqrt{a^2+b^2}} \le 1$$

$$\left(\frac{a}{\sqrt{a^2+b^2}}\right)^2 + \left(\frac{b}{\sqrt{a^2+b^2}}\right)^2 = 1$$

$$\cos\alpha = \frac{a}{\sqrt{a^2+b^2}} \qquad \text{sen}\,\alpha = \frac{b}{\sqrt{a^2+b^2}} \qquad -\pi \le \alpha \le \pi$$

$$y = \sqrt{a^2+b^2}\left(\frac{a}{\sqrt{a^2+b^2}}\,\text{sen}\,x + \frac{b}{\sqrt{a^2+b^2}}\cos x\right)$$

$$y = \sqrt{a^2+b^2}\left(\cos\alpha\,\text{sen}\,x + \text{sen}\,\alpha\cos x\right)$$

$$y = \sqrt{a^2+b^2}\,\text{sen}(\alpha + x)$$

$$\boxed{y = A\,\text{sen}(\alpha + x) \qquad A = \sqrt{a^2+b^2}}$$

ES:

$$y = \sqrt{3}\,\text{sen}\,x + \cos x$$

$a = \sqrt{3}$ $\quad b = 1$ $\quad \sqrt{a^2+b^2} = \sqrt{4} = 2$

$$y = \sqrt{a^2+b^2}\left(\frac{a}{\sqrt{a^2+b^2}}\,\text{sen}\,x + \frac{b}{\sqrt{a^2+b^2}}\cos x\right)$$

$$\frac{a}{\sqrt{a^2+b^2}} = \frac{\sqrt{3}}{2} \qquad \cos\alpha = \frac{\sqrt{3}}{2} \qquad \alpha = \frac{\pi}{6}$$

$$\frac{b}{\sqrt{a^2+b^2}} = \frac{1}{2} \qquad \text{sen}\,\alpha = \frac{1}{2}$$

$$y = 2\left(\cos\frac{\pi}{6}\,\text{sen}\,x + \text{sen}\,\frac{\pi}{6}\cos x\right)$$

$$y = 2\,\text{sen}\left(x + \frac{\pi}{6}\right)$$