MÉTODO DE SEPARACIÓN VARIABLES

$$\frac{\partial^2 z(x,y)}{\partial y^2} + x^2 \frac{\partial z(x,y)}{\partial x} = z(x,y)$$

H: EDenDP(2)L.

$$z(x,y) = F(x)\cdot G(y)$$

$$\frac{\partial z}{\partial x} = F'(x)G(y) \qquad \frac{\partial z}{\partial y} = F(x)\cdot G'(y)$$

$$\frac{\partial^2 z}{\partial y^2} = F(x)G''(y)$$

$$F(x)G''(y) + x^2F'(x)G(y) = F(x)G(y)$$

$$F(x)G''(y) = -x^2F'(x)G(y) + F(x)G(y)$$

$$F(x)G''(y) - F(x)G(y) = -x^2F'(x)G(y)$$

$$F(x)\left(G''(y) - G(y)\right) = G(y)\left(-x^2F'(x)\right)$$

$$\boxed{\frac{G''(y) - G(y)}{G(y)} = -\frac{x^2F'(x)}{F(x)}}$$

$$F(x)G''(y) = G(y)\left(-x^2F'(x) + F(x)\right)$$

$$\boxed{\frac{G''(y)}{G(y)} = \frac{-x^2F'(x) + F(x)}{F(x)}}$$

$$\frac{\partial^2 y(x,t)}{t^2} + \frac{\partial^2 y(x,t)}{\partial x \partial t} + 6\frac{\partial y(x,t)}{\partial x} = 0$$

H_0: $y(x,t) = F(x)\,G(t)$

$$\left.\begin{aligned} \frac{\partial y}{\partial x} &= F'(x)\,G(t) \\ \frac{\partial^2 y}{\partial x \partial t} &= F'(x)\,G'(t) \\ \frac{\partial^2 y}{\partial t^2} &= F(x)\cdot G''(t) \end{aligned}\right\}$$

$$F(x)\,G''(t) + F'(x)\,G'(t) + 6F'(x)\,G(t) = 0$$

$$F'(x)\,G'(t) + 6F'(x)\,G(t) = -F(x)\,G''(t)$$

$$F'(x)\left(G'(t) + 6\,G(t)\right) = -F(x)\,G''(t)$$

$$-\frac{F'(x)}{F(x)} = +\frac{G''(t)}{G'(t) + 6\,G(t)}$$

$$\frac{\partial z(x,y)}{\partial y} + \frac{\partial^2 z(x,y)}{\partial x \partial y} = z(x,y)$$

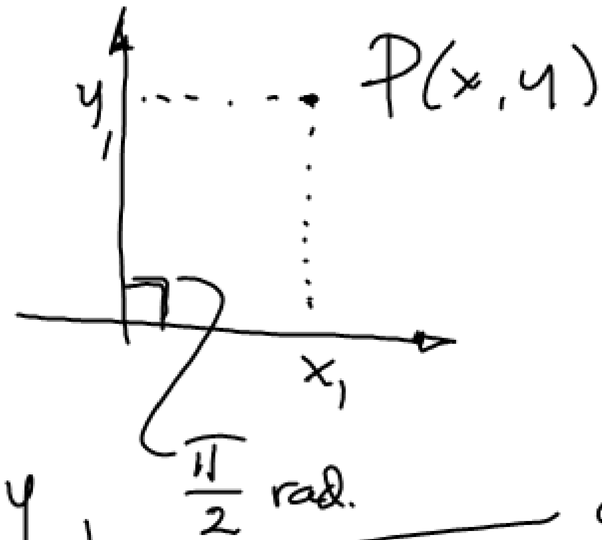
$$H_0: \quad z(x,y) = F(x)G(y)$$

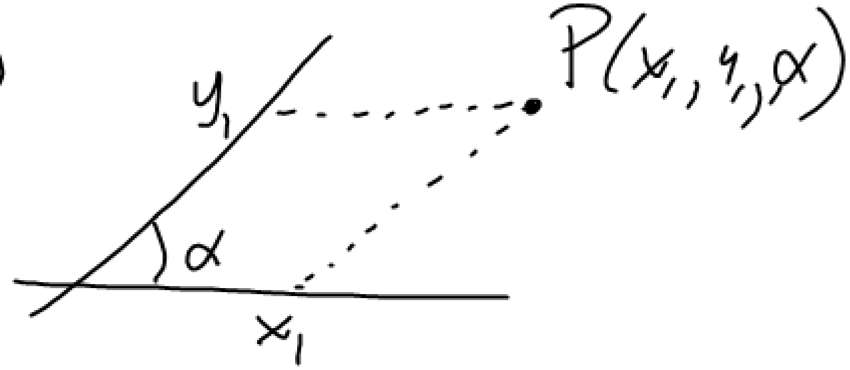
$$\left.\begin{array}{l} \dfrac{\partial z}{\partial y} = F(x)G'(y) \\ \dfrac{\partial^2 z}{\partial y \partial x} = F'(x)G'(y) \end{array}\right\} \quad F(x)G'(y) + F'(x)G'(y) = F(x)G(y)$$

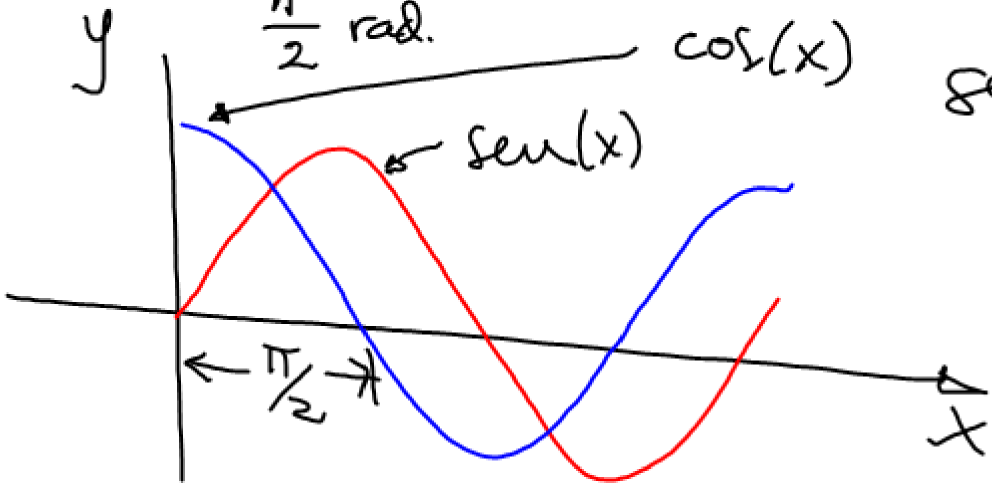
$$G'(y)\Big(F(x) + F'(x)\Big) = F(x)\,G(y)$$

$$z(x,y) = F(x) + G(y) \qquad\qquad \frac{G'(y)}{G(y)} = \frac{F(x)}{F(x) + F'(x)}$$

SERIE TRIGONOMÉTRICA FOURIER







sen(x) cartesiano

cos(x)

$$f(x) = C + \sum_{n=1}^{\infty}\left(a_n \cos\left(\frac{n\pi}{L}x\right) + b_n \operatorname{sen}\left(\frac{n\pi}{L}x\right)\right)$$

$$-L \leq x \leq L$$

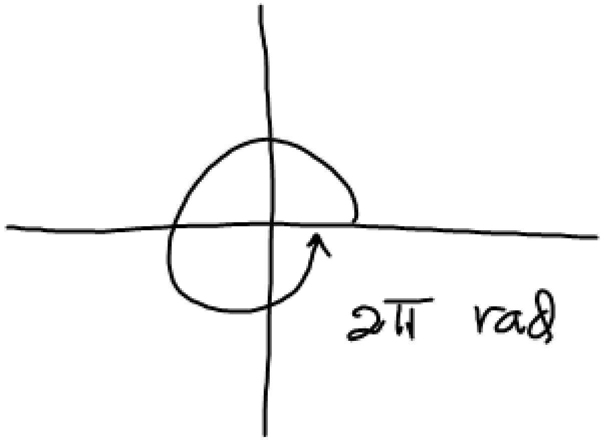
$$\boxed{x^2+4x+3}$$

$$-5 \leq x \leq 5$$

$$C = \frac{a_0}{2} \qquad a_0 = \frac{1}{L}\int_{-L}^{L} f(x)\,dx$$

$$a_n = \frac{1}{L}\int_{-L}^{L} f(x)\cos\left(\frac{n\pi}{L}x\right)dx$$

$$b_n = \frac{1}{L}\int_{-L}^{L} f(x)\operatorname{sen}\left(\frac{n\pi}{L}x\right)dx$$



$$\operatorname{sen}(n\pi) = 0$$

$$n = 1, 2, 3, \ldots, \infty$$

$$\cos(n\pi) = (-1)^n$$

$$n = 1, 2, 3, \ldots, \infty$$