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

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

$$\frac{\partial^2 z}{\partial x^2} = F''\cdot G \qquad \frac{\partial^2 z}{\partial x \partial y} = F'\cdot G'$$

$$F''G + F'G' = FG$$

$$F'G' = FG - F''G$$

$$\frac{G'}{G} = \frac{F - F''}{F'}$$

para $\alpha = 0$

$$\frac{G'}{G} = 0 \qquad \frac{F - F''}{F'} = 0$$

$$G'(y) = 0 \qquad F - F'' = 0$$

$$G(y) = k_1 \qquad F'' - F = 0$$

$$(D^2 - 1)F(x) = 0$$

$$(D+1)(D-1)F(x) = 0$$

$$F(x) = C_1 e^{-x} + C_2 e^{x}$$

$$z(x,y)_{\alpha=0} = C_{10} e^{-x} + C_{20} e^{x}$$

$$\frac{\partial z}{\partial x} = -C_{10} e^{-x} + C_{20} e^{x} \qquad \frac{\partial z}{\partial y} = 0$$

$$\frac{\partial^2 z}{\partial x^2} = C_{10} e^{-x} + C_{20} e^{x}$$

$$(C_{10} e^{-x} + C_{20} e^{x}) + (0) = C_{10} e^{-x} + C_{2} e^{x}$$

$$0 \equiv 0$$

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

$\alpha > 0 \quad \alpha = \beta^2 \quad \forall \beta \neq 0$

$$\frac{G'}{G} = \beta^2 \qquad \frac{F - F''}{F'} = \beta^2$$

$G' = \beta^2 G \qquad F - F'' = \beta^2 F'$

$(D - \beta^2) G(y) = 0 \qquad F'' + \beta^2 F' - F = 0$

$G(y) = k_1 e^{\beta^2 y}$

$(D^2 + \beta^2 D - 1) F(x) = 0$

$m^2 + \beta^2 m - 1 = 0$

$$m = \frac{-\beta^2 \pm \sqrt{\beta^4 + 4}}{2}$$

$$m_1 = \frac{-\beta^2 + \sqrt{\beta^4 + 4}}{2}$$

$$m_2 = \frac{-\beta^2 - \sqrt{\beta^4 + 4}}{2}$$

$$F(x) = C_1 e^{\left(\frac{-\beta^2 + \sqrt{\beta^4 + 4}}{2} x\right)} + C_2 e^{\left(\frac{-\beta^2 - \sqrt{\beta^4 + 4}}{2} x\right)}$$

$$z(x, y) = e^{\beta^2 y}\left(C_{10} e^{\left(\frac{-\beta^2 + \sqrt{\beta^4 + 4}}{2} x\right)} + C_{20} e^{\left(\frac{-\beta^2 - \sqrt{\beta^4 + 4}}{2} x\right)}\right)$$

$$\alpha < 0 \qquad \alpha = -\beta^2$$

$$\frac{G'}{G} = -\beta^2 \qquad \frac{F - F''}{F'} = -\beta^2$$

$$(D + \beta^2)\, G(y) = 0 \qquad F - F'' = -\beta^2 F'$$

$$G(y) = k_1 e^{-\beta^2 y}$$

$$F'' - \beta^2 F' - F = 0$$

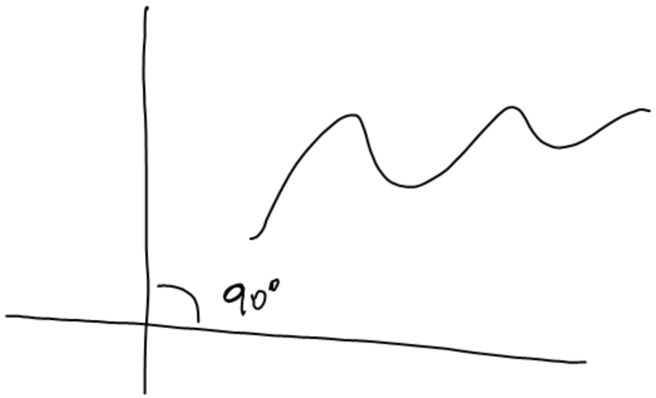
$$(D^2 - \beta^2 - 1) F(x) = 0$$

$$m^2 - \beta^2 - 1 = 0$$

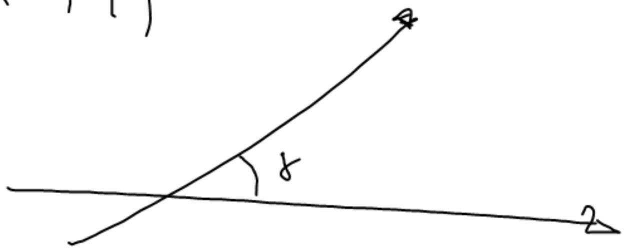
$$m = \frac{\beta^2 \pm \sqrt{\beta^4 + 1}}{2}$$

$$F(x) = C_1 e^{\left(\frac{\beta^2 + \sqrt{\beta^4+1}}{2} x\right)} + C_2 e^{\left(\frac{\beta^2 - \sqrt{\beta^4+1}}{2} x\right)}.$$

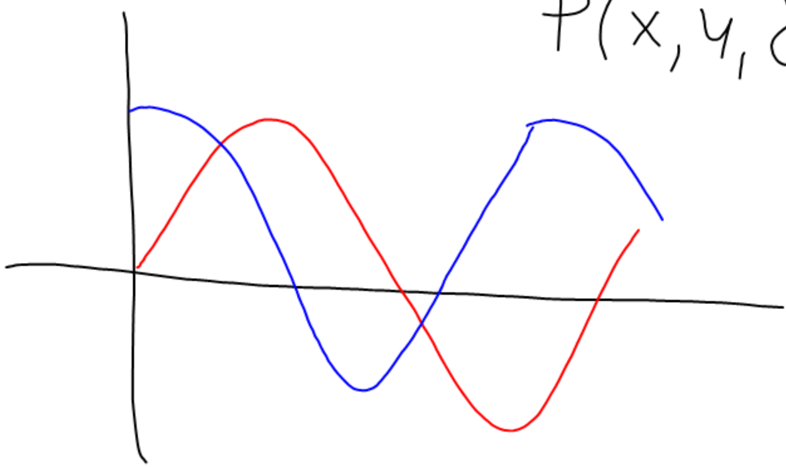
$$Z(x,y)_{\alpha < 0} = e^{-\beta^2 y}\left(C_{10} e^{\left(\frac{\beta^2 + \sqrt{\beta^4+1}}{2} x\right)} + C_{20} e^{\left(\frac{\beta^2 - \sqrt{\beta^4+1}}{2} x\right)}\right).$$



$P(x, y)$



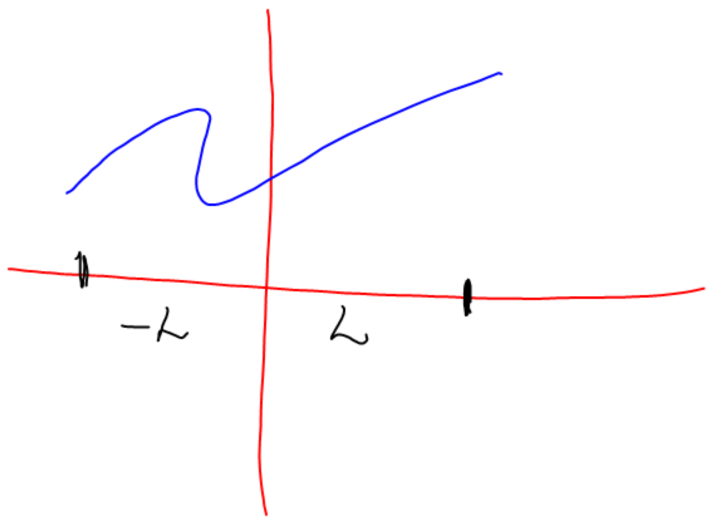
$P(x, y, \gamma)$



$$z(x,y) = F_1(y + m_1 x) + F_2(y + m_2 x).$$

Serie Trigonométrica de Fourier

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



$C \qquad a_n \qquad b_n$

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

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

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

$$f(x) = x^2 - 3x \qquad -2 \le x \le 2 \qquad L=2$$

$$a_0 = \frac{1}{2}\int_{-2}^{2}(x^2-3x)\,dx \Rightarrow \frac{1}{2}\left[\int x^2dx\right]_{-2}^{2} - \frac{3}{2}\left[\int_{-2}^{2} x\,dx\right]$$

$$= \frac{1}{2}\left[\frac{x^3}{3}\right]_{-2}^{2} - \frac{3}{2}\left[\frac{x^2}{2}\right]_{-2}^{2}$$

$$= \frac{1}{2}\left(\frac{(+2)^3}{3} - \frac{(-2)^3}{3}\right) - \frac{3}{2}\left(\frac{(2)^2}{2} - \frac{(-2)^2}{2}\right)$$

$$= \frac{1}{6}(16) \Rightarrow \frac{8}{3} \qquad C = \frac{8}{6} \Rightarrow \frac{4}{3}.$$

$$a_n = \frac{1}{2}\int_{-2}^{2}(x^2-3x)\cos\left(\frac{n\pi}{2}x\right)dx$$

$$= \frac{1}{2}\left[\int x^2\cos\left(\frac{n\pi x}{2}\right)dx - 3\int x\cos\left(\frac{n\pi}{2}x\right)dx\right]_{-2}^{2}$$