Si $y_1 = x^{-\frac{1}{2}} \cos(x)$ $\quad y_2 = x^{-\frac{1}{2}} \operatorname{sen}(x)$

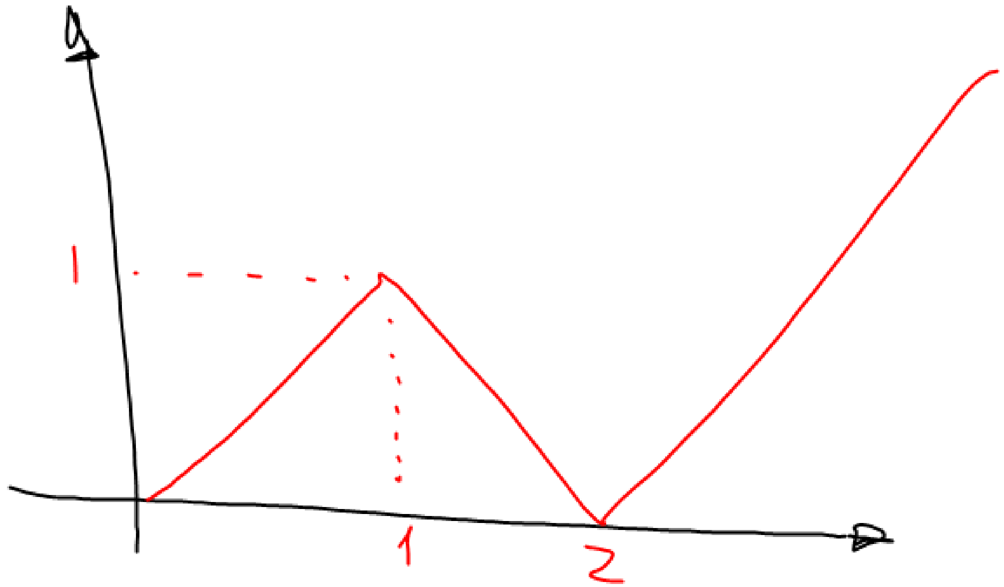
EDO(2) L CV $\underline{H}$. $x^2 \cdot y'' + x \cdot y' + \left(x^2 - \frac{1}{4}\right) \cdot y = 0$

Determinar la solución general

EDO(2) L CV $\underline{NH}$ $x^2 \cdot y'' + x \cdot y' + \left(x^2 - \frac{1}{4}\right) y = x^{\frac{3}{2}}$

ojo

el coeficiente de la derivada de mayor orden debe "siempre" ser 1.


1
1
2

Laplace

$$2x'' + 4x = 8 \cdot \delta(t - 2\pi) \qquad x(0) = 3$$
$$x'(0) = 0$$

$$x'' + 9x = \operatorname{sen}(2t) \qquad x(0) = 0, \quad x'(0) = 0$$

$$x(t) = x_1(t) \qquad x_1(0) = 0, \quad x_2(0) = 0$$

$$x'(t) = x_1'(t) = x_2(t)$$

$$x''(t) = \dot{x}_2(t) = -9x_1(t) + \operatorname{sen}(2t)$$

$$\frac{d}{dt}\begin{bmatrix} x_1(t) \\ x_2(t) \end{bmatrix} = \underbrace{\begin{bmatrix} 0 & 1 \\ -9 & 0 \end{bmatrix}}_{AA} \begin{bmatrix} x_1(t) \\ x_2(t) \end{bmatrix} + \underbrace{\begin{bmatrix} 0 \\ \operatorname{sen}(2t) \end{bmatrix}}_{BB} \qquad x_0 = \begin{bmatrix} 0 \\ 0 \end{bmatrix}$$

$$\bar{x} = e^{At} x_0 + \int_0^t e^{A(t-\tau)} b(\tau)\, d\tau.$$