

$$y'' + y = \begin{cases} 0 & \text{dla } t < 1 \\ 1 & \text{dla } 1 \leq t \leq 3 \\ 0 & \text{dla } t > 3 \end{cases}$$

$$y(t-1) \rightarrow -1$$

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$$\mathcal{L}\{y(t)\} = Y(s); \quad \mathcal{L}\{y''\} = s^2 Y(s) - s y(0) - s^0 \cdot y'(0)$$

$$y(0) = 0; \quad y'(0) = 0$$

$$s^2 Y(s) + Y(s) = \frac{1}{s} \cdot e^{-s} - \frac{1}{s} \cdot e^{-3s}$$

$$Y(s) \cdot (s^2 + 1) = \frac{1}{s} \cdot e^{-s} - \frac{1}{s} \cdot e^{-3s} \cdot 1(1)$$

$$Y(s) = \frac{1 \cdot e^{-s}}{s(s^2 + 1)} - \frac{1}{s(s^2 + 1)} \cdot e^{-3s}$$

$$\frac{1}{s(s^2 + 1)} = \frac{A}{s} + \frac{B \cdot s + C}{s^2 + 1}$$

$$\begin{array}{l|l} s^2 & A + B = 0 \rightarrow A = B = -1 \\ s^1 & C = 0 \\ s^0 & A = 1 \end{array} \quad \underline{A = 1} \quad \underline{B = -1}$$

$$1 = A(s^2 + 1) + (B \cdot s + C) \cdot s$$

$$1 = \underline{A} s^2 + \underline{A} + \underline{B} \cdot s^2 + \underline{C} s$$

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

$$y(t) = \left(1(t) \Big|_{t:=t-1} - \cos t \Big|_{t:=t-1} \right) - \left(1(t) \Big|_{t:=t-3} - \cos t \Big|_{t:=t-3} \right)$$

$$y(t) = 1(t-1) - \cos(t-1) - 1(t-3) + \cos(t-3)$$

$$y(t) = (1(t-1) - \cos(t-1)) \cdot y(t-1) - (1(t-3) - \cos(t-3)) \cdot y(t-3)$$

$$y(t) = (1 - \cos(t-1)) \cdot y(t-1) - (1 - \cos(t-3)) \cdot y(t-3)$$