

Exo 01 (04)

$$\frac{P+3}{(P+1)(P+2)} = \frac{P+2+1}{(P+1)(P+2)}$$

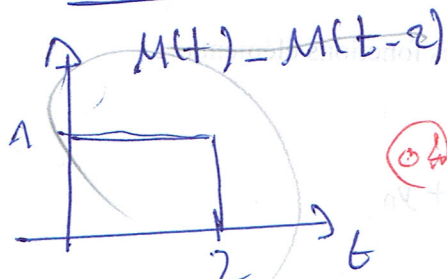
$$= \frac{\cancel{P+2}}{(P+1)\cancel{(P+2)}} + \frac{1}{(P+1)(P+2)}$$

$$= \frac{1}{(P+1)} + \frac{1}{(P+1)(P+2)}$$

$$= \frac{2}{(P+1)} - \frac{1}{P+2} \Rightarrow$$

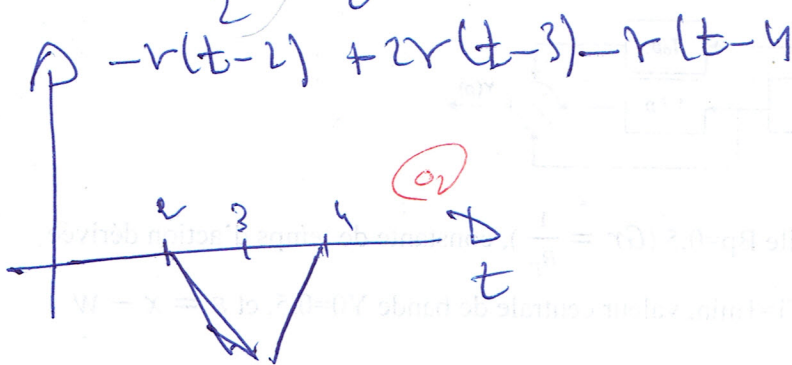
$$= 2e^{-t} - e^{-2t}$$

Exo 2 (08)



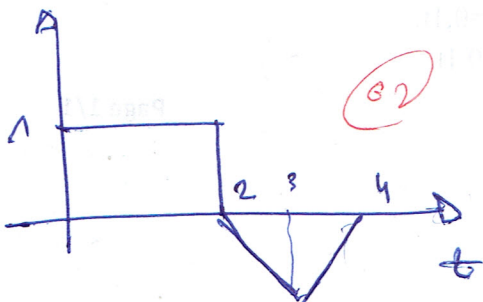
$$X_1 = \mathcal{L}\{M(t)\} - \mathcal{L}\{M(t-2)\}$$

$$= \text{rect}\left(\frac{t-1}{2}\right)$$



$$E = \int_0^2 (X_1(t))^2 dt = \int_0^2 1 dt = 2$$

deterministe



Ex 3)

$$y(t) = C_r \varepsilon(t) + \frac{C_r}{T_i} \int_0^t \varepsilon(t) dt + T_d \frac{d\varepsilon(t)}{dt} + y_0$$

$$\begin{cases} T_i = 1 \\ T_d = 0,5 \\ C_r = 2 \\ y_0 = 0,5 \end{cases} \Rightarrow y(t) = 2\varepsilon(t) + \int_0^t \varepsilon(t) dt + 0,5 \frac{d\varepsilon(t)}{dt} + 0,5$$

$$\textcircled{1} - Y(p) = 2\varepsilon(p) + \frac{1}{p} \varepsilon(p) + 0,5 p \varepsilon(p)$$

$$Y(p) = \varepsilon(p) \left(2 + \frac{1}{p} + 0,5 p \right)$$

$$\frac{Y(p)}{\varepsilon(p)} = C(p) = \left(2 + \frac{1}{p} + 0,5 p \right) \quad (\text{structure mix})$$

$$\varepsilon = \Delta X - \Delta W \Rightarrow \varepsilon = -0,1 \Rightarrow \varepsilon(p) = \frac{-0,1}{p}$$

$$\text{donc } Y(p) = \varepsilon(p) \cdot \left(2 + \frac{1}{p} + 0,5 p \right) = \frac{-0,2}{p} - \frac{0,1}{p^2} - 0,05$$

$$Y^{-1}(Y(p)) \Rightarrow y(t) = -0,2 M(t) - 0,1 t - 0,05 \delta(t)$$

$$\varepsilon(t) = \Delta X - \Delta W = 0,1 \Rightarrow \varepsilon(p) = \frac{0,1}{p}, Y(p) = \left(\frac{0,2}{p} + \frac{0,1}{p^2} + 0,05 \right)$$

$$y(t) = 0,2 \quad | \quad y(t) = 0,2 M(t) + 0,1 t + 0,05 \delta$$

$$\varepsilon(t) = \Delta X - \Delta W = -0,1 t \Rightarrow \varepsilon(p) = \frac{-0,1}{p^2}$$

$$Y(p) = \frac{-0,1}{p^2} \left(2 + \frac{1}{p} + 0,5 p \right) = \frac{-0,2}{p^2} - \frac{0,1}{p^3} + \frac{0,05}{p}$$

$$y(t) = -0,2 t - 0,1 t^2 + 0,05 M(t)$$

$$\varepsilon(t) = \Delta X - \Delta W = 0,1 t \Rightarrow \varepsilon(p) = \frac{0,1}{p^2}$$

$$y(t) = 0,2 t + 0,1 t^2 + 0,05 M(t)$$