

$$\bullet Y_1(p) = -1 \left(-\frac{1}{2p} + \frac{1}{p^2} + \frac{1}{2} \cdot \frac{p + 1/4}{\left(p + \frac{1}{4}\right)^2 + \left(\frac{\sqrt{15}}{4}\right)^2} - \frac{7}{2\sqrt{15}} \cdot \frac{\sqrt{15}/4}{\left(p + \frac{1}{4}\right)^2 + \left(\frac{\sqrt{15}}{4}\right)^2} \right)$$

$$\bullet Y_2(p) = \frac{e^{-p}}{p} - \frac{2e^{-p}}{p^2} - e^{-p} \frac{p + 1/4}{\left(p + \frac{1}{4}\right)^2 + \left(\frac{\sqrt{15}}{4}\right)^2} + \frac{7e^{-p}}{\sqrt{15}} \cdot \frac{\sqrt{15}/4}{\left(p + \frac{1}{4}\right)^2 + \left(\frac{\sqrt{15}}{4}\right)^2}$$

$$\bullet Y_3(p) = -\frac{e^{-2p}}{2p} + \frac{e^{-2p}}{p^2} + \frac{e^{-2p}}{2} \cdot \frac{p + 1/4}{\left(p + \frac{1}{4}\right)^2 + \left(\frac{\sqrt{15}}{4}\right)^2} - \frac{7e^{-2p}}{2\sqrt{15}} \cdot \frac{\sqrt{15}/4}{\left(p + \frac{1}{4}\right)^2 + \left(\frac{\sqrt{15}}{4}\right)^2}$$

Maintenant, trouvons l'originale de chaque partie.

$$\mathcal{L}^{-1}(Y_1(p)) = -\frac{U(t)}{2} + t U(t) + \frac{e^{-t/4}}{2} \cos\left(\frac{\sqrt{15}}{4} \cdot t\right) U(t) - \frac{7}{2\sqrt{15}} \cdot e^{-t/4} \sin\left(\frac{\sqrt{15}}{4} \cdot t\right) U(t)$$

$$\mathcal{L}^{-1}(Y_2(p)) = U(t-1) - 2(t-1)U(t-1) - e^{-\frac{(t-1)}{4}} \cos\left(\frac{\sqrt{15}}{4}(t-1)\right) U(t-1) + \frac{7}{\sqrt{15}} \cdot e^{-\frac{(t-1)}{4}} \sin\left(\frac{\sqrt{15}}{4}(t-1)\right) U(t-1)$$

$$\mathcal{L}^{-1}(Y_3(p)) = -\frac{U(t-2)}{2} + (t-2)U(t-2) + \frac{e^{-\frac{(t-2)}{4}}}{2} \cos\left(\frac{\sqrt{15}}{4}(t-2)\right) U(t-2) - \frac{7e^{-\frac{(t-2)}{4}}}{2\sqrt{15}} \sin\left(\frac{\sqrt{15}}{4}(t-2)\right) U(t-2)$$

$$y(t) = y_1(t) + y_2(t) + y_3(t)$$

On obtient donc :

$$y(t) = U(t) \left(-\frac{1}{2} + t + \frac{e^{-t/4}}{2} \cos\left(\frac{\sqrt{15}}{4} \cdot t\right) - \frac{7}{2\sqrt{15}} \cdot e^{-t/4} \sin\left(\frac{\sqrt{15}}{4} \cdot t\right) \right)$$

$$+ U(t-1) \left(-1 - 2(t-1) - e^{-\frac{(t-1)}{4}} \cos\left(\frac{\sqrt{15}}{4}(t-1)\right) + \frac{7}{\sqrt{15}} \cdot e^{-\frac{(t-1)}{4}} \sin\left(\frac{\sqrt{15}}{4}(t-1)\right) \right)$$

$$+ U(t-2) \left(-\frac{1}{2} + (t-2) + \frac{e^{-\frac{(t-2)}{4}}}{2} \cos\left(\frac{\sqrt{15}}{4}(t-2)\right) - \frac{7e^{-\frac{(t-2)}{4}}}{2\sqrt{15}} \sin\left(\frac{\sqrt{15}}{4}(t-2)\right) \right)$$