

Exercice n° 1:

$$1) \mathcal{L}(1+t) = \mathcal{L}(1) + \mathcal{L}(t) = \frac{1}{s} + \frac{1}{s^2}$$

$$2) \mathcal{L}(t+t^2-t^3) = \mathcal{L}(t) + \mathcal{L}(t^2) - \mathcal{L}(t^3) \\ = \frac{1}{s^2} + \frac{2!}{s^3} - \frac{3!}{s^4}$$

$$3) \mathcal{L}(t+e^{-t}) = \mathcal{L}(t) + \mathcal{L}(e^{-t}) = \frac{1}{s^2} + \frac{1}{s+1}$$

$$4) \mathcal{L}(5+te^{-t}) = \mathcal{L}(5) + \mathcal{L}(te^{-t}) = \frac{5}{s} + \frac{1}{(s+1)^2}$$

$$5) \mathcal{L}\left[\left(2-t-\frac{1}{2}t^2\right)e^{2t}\right] = \mathcal{L}(2e^{2t}) - \mathcal{L}(te^{2t}) - \mathcal{L}\left(\frac{1}{2}t^2e^{2t}\right) \\ = \frac{2}{s-2} - \frac{1}{(s-2)^2} - \frac{1 \cdot 2!}{2(s-2)^3}$$

$$6) \mathcal{L}(\cos t + \sin 2t) = \mathcal{L}(\cos t) + \mathcal{L}(\sin 2t) \\ = \frac{s}{s^2+1} + \frac{2}{s^2+4}$$

Exercice n° 2:

$$1) \mathcal{L}^{-1}\left[\frac{s+2}{(s+3)(s+4)}\right]$$

$$\text{on a } \frac{s+2}{(s+3)(s+4)} = \frac{-1}{s+3} + \frac{2}{s+4}$$

D'après le tableau:

$$\mathcal{L}^{-1}\left[\frac{s+2}{(s+3)(s+4)}\right] = -e^{-3t} + 2e^{-4t}$$