3.05

fredag 26 januari 2024 21:45

$$u(t) = \underbrace{\theta(t)}_{f(t)} - 2\underbrace{\theta(t-1)}_{g(t)} + \underbrace{\theta(t-2)}_{h(t)}$$

$$\mathcal{L}f(s) = 1/s$$

$$\mathcal{L}g(s) = \int_{-\infty}^{\infty} e^{-st}\,\theta(t-1)\,dt \Rightarrow$$

$$\Rightarrow \int_{1}^{T} e^{-st}\,dt = \left[-\frac{e^{-st}}{s}\right]_{1}^{\infty} =$$

$$= \lim_{T\to\infty} -\frac{e^{-sT}}{s} + \frac{e^{-s}}{s} \to \frac{e^{-s}}{s}$$

$$\mathcal{L}h(s) = \int_{-\infty}^{\infty} e^{-st}\,\theta(t-2)\,dt \Rightarrow$$

$$\Rightarrow \int_{2}^{\infty} e^{-st}\,dt = \left[-\frac{e^{-st}}{s}\right]_{2}^{\infty} =$$

$$= \lim_{t\to\infty} -\frac{e^{sT}}{s} + \frac{e^{-2s}}{s} \to \frac{e^{-2s}}{s}$$

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