



문제: Laplace 변환

$$f(t) = e^{-t} \cos 3t$$

$$\cos kt = \frac{s}{s^2 + \omega^2}$$

$$f(t-\lambda) \rightarrow e^{-\lambda s} F(s)$$

$$e^{-\lambda t} f(t) \rightarrow F(s + \lambda)$$

$$\lambda = 1.$$

$$e^{-t} f(t) \rightarrow$$

$$\frac{s}{(s+1)^2 + 3^2} = \frac{s}{s^2 + 2s + 10}$$

문제: 11번 2020년 1교시.

$u(t) = \text{step input}$

$$U(s) = \frac{1}{s}$$

$$G(s) = \frac{1}{s+1}$$

$$GU = \frac{1}{s+1} \times \frac{1}{s}$$

$$\mathcal{L}^{-1}\{GU\} = e^{-t} * 1$$

$$e^{-t} * 1 = \int_0^t e^{-t+\tau} d\tau$$

$$\int_0^t e^{-z} dz = -e^{-z} \Big|_0^t = -e^{-t} - (-1) = 1 - e^{-t}$$

$$\frac{d}{dz} e^{-z} = -e^{-z}$$