2024/10/18 - Transform Techniques

$$L(f(t)) = \int_0^\infty e^{-st} f(t)\, dt$$

$$\hat{f}(s) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{\infty} f(t)\, e^{-ist}\, dt$$

$$= \frac{1}{\sqrt{2\pi}} \int_0^1 \cos t\, e^{-ist}\, dt$$

$$I = \frac{e^{-ist}}{-is} \cos t - \frac{1}{is} \int \sin t\, e^{-ist}\, dt$$

$$- \frac{1}{is} \left[\frac{\sin t\, e^{-ist}}{-is} \right.$$

$$+ \frac{1}{is} \int \cos t \, e^{-ist} dt \Big)$$

$$\frac{e^{-ist}\cos t}{-is} - \frac{\sin t \, e^{-ist}}{s^2} + \frac{I}{s^2}$$

$$I\left(1 - \frac{1}{s^2}\right) = -\frac{is}{s^2} + \frac{e^{-is}\cos(1)i}{s}$$

$$- \frac{\sin 1 \, e^{-is}}{s^2}$$

$$I\left(\frac{s^2-1}{s^2}\right) = \frac{-is + e^{-is}(\cos}{s^2}$$