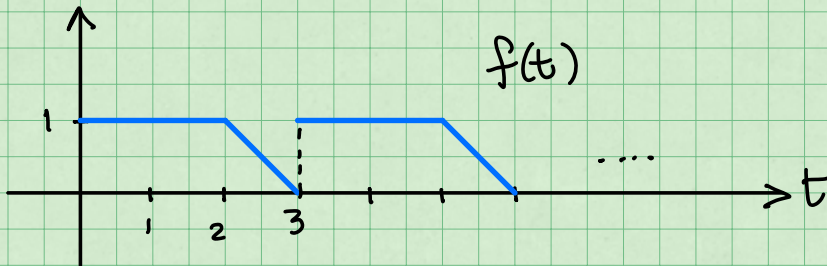


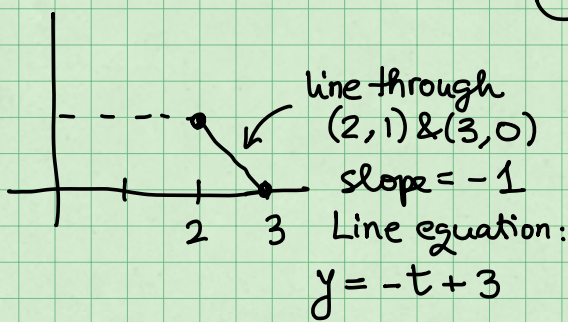
Daily Laplace - 4/6

Periodic Function: Find $\mathcal{L}\{f(t)\}$



Period $T=3$

$$\mathcal{L}\{f(t)\} = \frac{1}{1 - e^{-3s}} \int_0^3 e^{-st} f(t) dt$$



$$\int_0^2 e^{-st} dt + \int_2^3 e^{-st} (t+3) dt$$

$$= \left. \frac{-1}{s} e^{-st} \right|_{t=0}^2 +$$

$$+ \left(\frac{t}{s} e^{-st} + \frac{1}{s^2} e^{-st} \right) \Big|_{t=2}^3$$

$$+ 3 \frac{1}{s} e^{-st} \Big|_{t=2}^3$$

$$= \frac{-1}{s} e^{-2s} + \frac{1}{s} + \frac{3}{s} e^{-3s} + \frac{1}{s^2} e^{-3s}$$

$$- \frac{2}{s} e^{-2s} - \frac{1}{s^2} e^{-2s}$$

$$- \frac{3}{s} e^{-3s} + \frac{3}{s} e^{-2s}$$

$$\int e^{-st} \cdot t dt \quad u=t \quad dv=e^{-st} dt$$

$$du=dt \quad v=-\frac{1}{s} e^{-st}$$

$$= \frac{-t}{s} e^{-st} + \int \frac{1}{s} e^{-st} dt$$

$$= \frac{-t}{s} e^{-st} - \frac{1}{s^2} e^{-st}$$