Engineering Mathematics　　Homework 8 Solution

1. $Find: \mathscr{L}^{-1}\{\frac{(1+e^{-2s})^2}{s+2}\}$

Sol:

$$\mathscr{L}^{-1}\{\frac{(1+e^{-2s})^2}{s+2}\} = \mathscr{L}^{-1}\{\frac{1}{s+2}+\frac{2e^{-2s}}{s+2}+\frac{e^{-4s}}{s+2}\}$$
$$= e^{-2t} + 2e^{-2(t-2)}H(t-2) + e^{-2(t-4)}H(t-4)$$

2. $Find: \mathscr{L}^{-1}\{\frac{s+2}{s^2+4s+13}\}$

Sol:

$$\mathscr{L}^{-1}\{\frac{s+2}{s^2+4s+13}\}$$
$$= \mathscr{L}^{-1}\{\frac{s+2}{(s+2)^2+3^2}\}$$
$$= e^{-2t}\cos 3t$$

3. $f(t)=t^2+3t+2,\ find\ \mathscr{L}\{f(t)H(t-2)\}$

Sol:

$$\mathscr{L}\{f(t)H(t-2)\}$$
$$= \mathscr{L}\{(t^2+3t+2)H(t-2)\}$$
$$= \mathscr{L}\{((t-2)^2+7(t-2)+12)H(t-2)\}$$
$$= \frac{2}{s^3}e^{-2s} + \frac{7}{s^2}e^{-2s} + \frac{12}{s}e^{-2s}$$