14.7 For the network shown in Fig. P14.7, find $i_o(t)$, $t > 0$.

CS

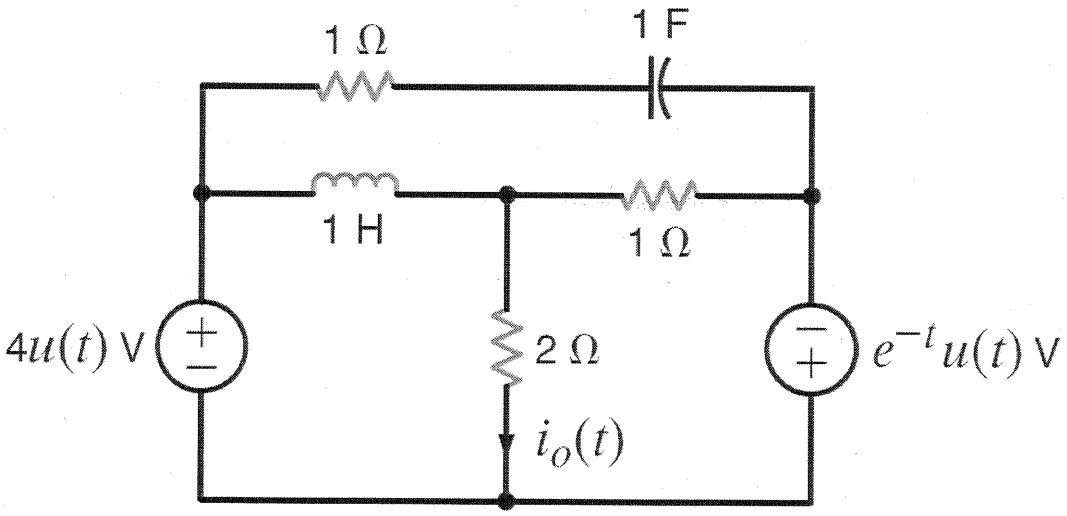
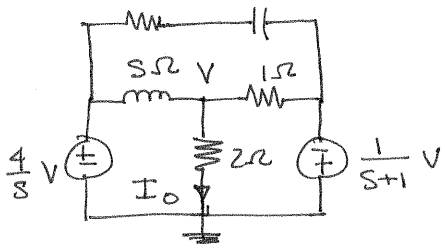


Figure P14.7

SOLUTION: $t=0^-$: No excitation. So, all initial conditions $=0$.



$$\frac{V-4/s}{s}+\frac{V+\frac{1}{s+1}}{1}+\frac{V}{2}=0$$

$$V\left(\frac{1}{s}+\frac{3}{2}\right)=\frac{4}{s2}-\frac{1}{s+1}$$

$$V=\frac{2(-s^2+4s+4)}{s(s+1)(3s+2)}$$

$$I_o=V/2=\frac{1/3\,(-s^2+4s+4)}{s(s+1)(s+2/3)}=\frac{K_1}{s}+\frac{K_2}{s+1}+\frac{K_3}{s+2/3}$$

$$K_1=2 \qquad K_2=-1 \qquad K_3=-4/3$$

$$i_o(t)=\left[2-e^{-t}-\frac{4}{3}e^{-(2/3)t}\right]u(t)$$