14.21 Use Thévenin's theorem to find $v_o(t)$, $t > 0$, in the network in Fig. P14.21. CS

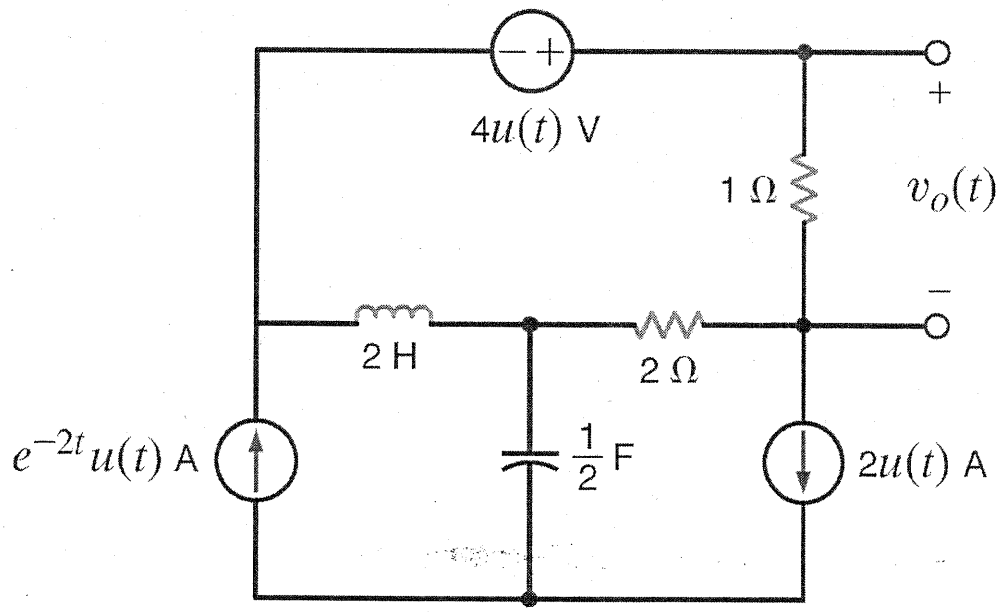
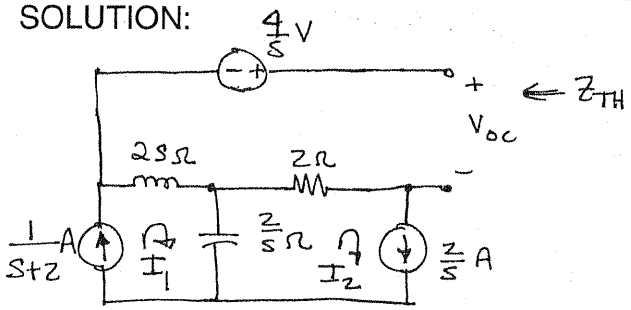


Figure P14.21

SOLUTION:



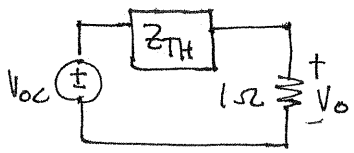
$$I_1 = \frac{1}{s+2} \qquad I_2 = \frac{2}{s}$$

$$\frac{4}{s} = V_{oc} - 2I_2 - 2sI_1$$

$$V_{oc} = \frac{4}{s} + \frac{4}{s} + \frac{2s}{s+2} = \frac{8}{s} + \frac{2s}{s+2}$$

$$V_{oc} = \frac{2s^2+8s+16}{s(s+2)}$$

$$Z_{TH} = 2s+2$$



$$V_o = V_{oc}\frac{(1)}{1+Z_{TH}} = \frac{2(s^2+4s+8)}{s(s+2)(s+1.5)2} = \frac{s^2+4s+8}{s(s+1.5)(s+2)} = \frac{8/3}{s} - \frac{17/3}{s+1.5} + \frac{4}{s+2}$$

$$\boxed{v_o(t) = \left[\frac{8}{3} - \frac{17}{3}e^{-1.5t} + 4e^{-2t}\right]u(t) \text{ V}}$$