14.17 Use superposition to find $v_o(t)$, $t > 0$, in the network shown in Fig. P14.17.

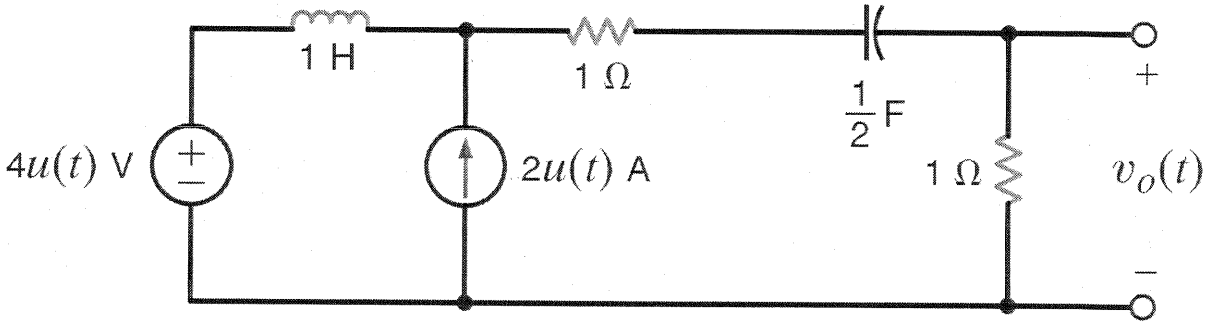
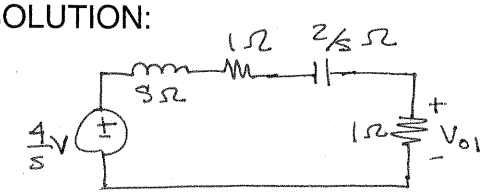
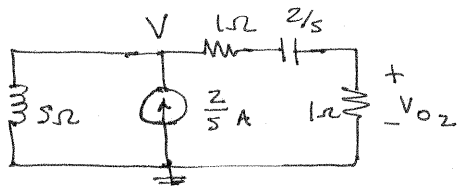


Figure P14.17

SOLUTION:





$$V_{o1} = \frac{4}{s}\left[\frac{1}{s+1+\frac{2}{s}+1}\right]$$

$$V_{o1} = \frac{4}{s^2+2s+2}$$

$$\frac{V}{s} + \frac{V}{2+2/s} = \frac{2}{s} \Rightarrow V\left[1+\frac{s^2}{2(s+1)}\right] = 2$$

$$V = \frac{4(s+1)}{s^2+2s+2} \qquad \frac{V_{o2}}{V} = \frac{1}{2+\frac{2}{s}} = \frac{s}{2(s+1)}$$

$$V_{o2} = \frac{2s}{s^2+2s+2}$$

$$V_o = V_{o1}+V_{o2} = \frac{2(s+2)}{s^2+2s+2} = \frac{K_1^*}{s+1+j1} + \frac{K_1}{s+1-j1} \qquad K_1 = \sqrt{2}\angle -45^\circ$$

$$\boxed{v_o(t) = \left[2\sqrt{2}\,e^{-t}\cos(t-45^\circ)\,V\right]u(t)}$$