14.60 Determine the steady-state response $i_o(t)$ for the network in Fig. P14.60.

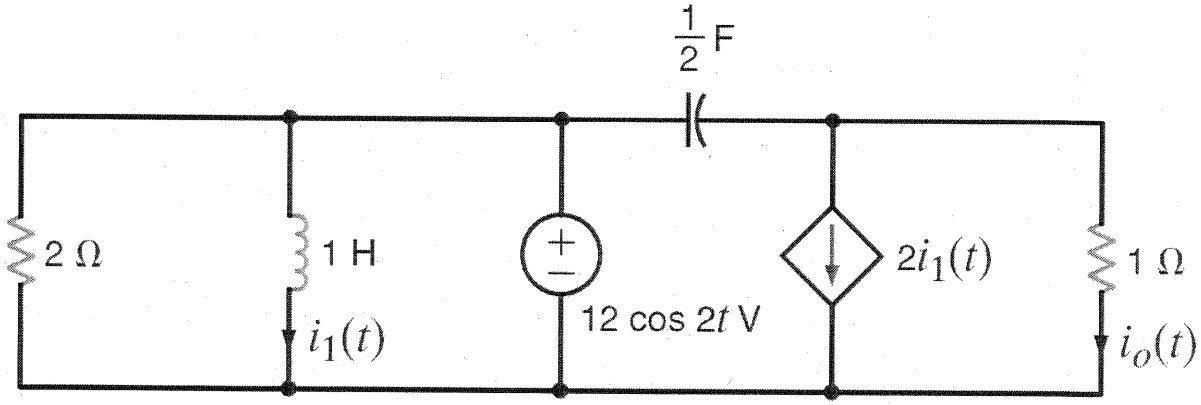
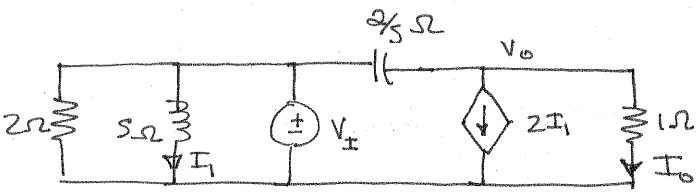


Figure P14.60

SOLUTION: Use KCL,



$I_1 = \frac{V_I}{s}$ $\quad I_o = \frac{V_o}{1}$

$$\frac{V_o - V_I}{2/s} + 2I_1 + \frac{V_o}{1} = 0 \Rightarrow V_o\left(\frac{s}{2}+1\right) = V_I\left(\frac{s}{2} - \frac{2}{s}\right)$$

$$\frac{V_o}{V_I} = \frac{s-2}{s} \Rightarrow I_o = \frac{V_I(s-2)}{s}$$

At steady-state, $V_I = 12\angle 0°$ V & $s = j2$

$I_o = 12\sqrt{2}\angle 45°$ A

$$\boxed{i_o(t) = 12\sqrt{2}\cos(2t+45°)\ \text{A}}$$