

14.63 Find the steady-state response $v_o(t)$, for $t > 0$, in the network in Fig. P14.63.

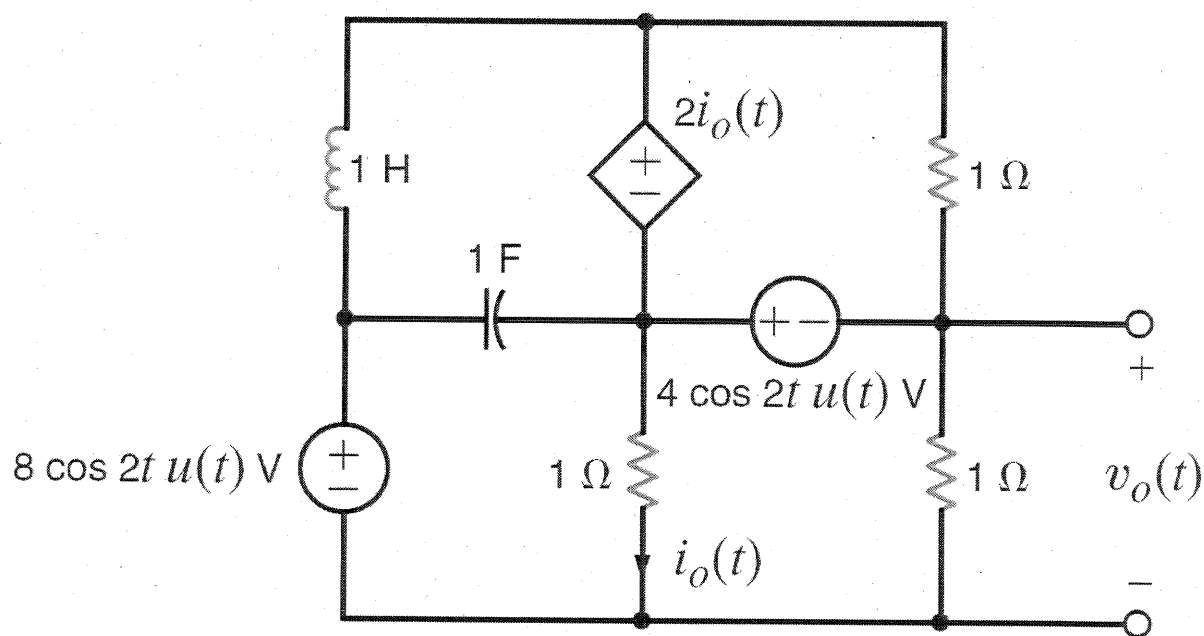
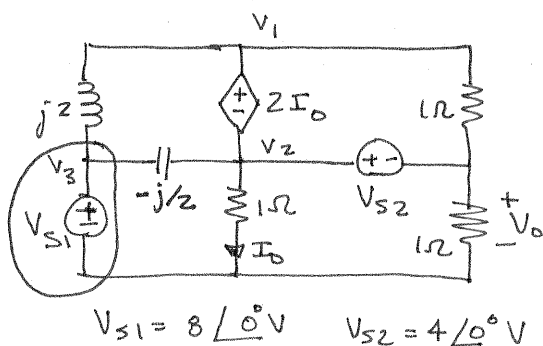


Figure P14.63

SOLUTION: Go straight to freq domain. $s \rightarrow j2$ & sources \rightarrow phasors.



$$V_3 = 8 \angle 0^\circ \text{ V} \quad V_2 - V_o = 4 \angle 0^\circ \text{ V}$$

$$V_1 - V_2 = 2I_o = 2(V_2/1) \Rightarrow V_1 = 3V_2$$

At super node:

$$\frac{V_1 - V_3}{j2} + \frac{V_2 - V_3}{-j/2} + \frac{V_2}{1} + \frac{V_o}{1} = 0$$

$$\text{yields } V_o = 5.22 \angle 97.8^\circ \text{ V}$$

$$v_o(t) = 5.22 \cos(2t + 97.8^\circ) \text{ V}$$