14.8 Find $v_o(t), t > 0$, in the network in Fig. P14.8 using node equations.

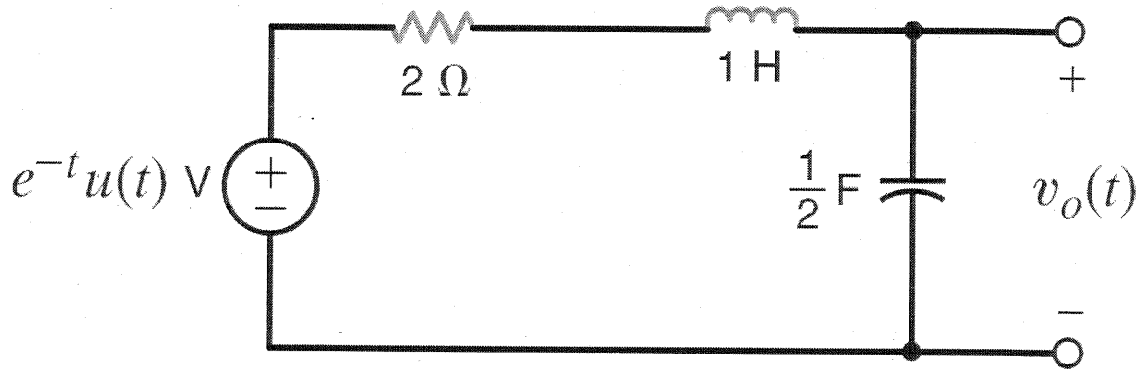
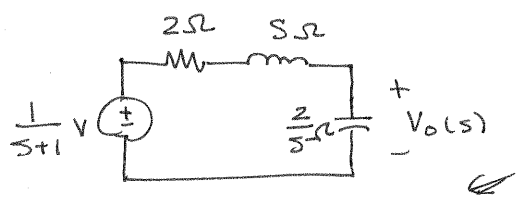


Figure P14.8

SOLUTION: $v_c(0^-) = 0\text{V}$



$$\frac{V_o(s)}{2/s} + \frac{V_o(s) - \frac{1}{s+1}}{s+2} = 0$$

$$\frac{sV_o}{2} + \frac{V_o}{s+2} - \frac{1}{(s+2)(s+1)} = 0$$

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

$$V_o = \frac{2}{(s+1)(s^2+2s+2)} = \frac{K_1}{s+1} + \frac{K_2}{s+1-j1} + \frac{K_2^*}{s+1+j1}$$

$$K_1 = 2 \qquad K_2 = \frac{2}{(j1)(j2)} = -1 \qquad K_2^* = -1$$

$$V_o = \frac{2}{s+1} - \frac{1}{s+1-j1} - \frac{1}{s+1+j1}$$

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