14.10 Use nodal analysis to find $v_o(t)$, $t > 0$, in the network in Fig. P14.10. PSV

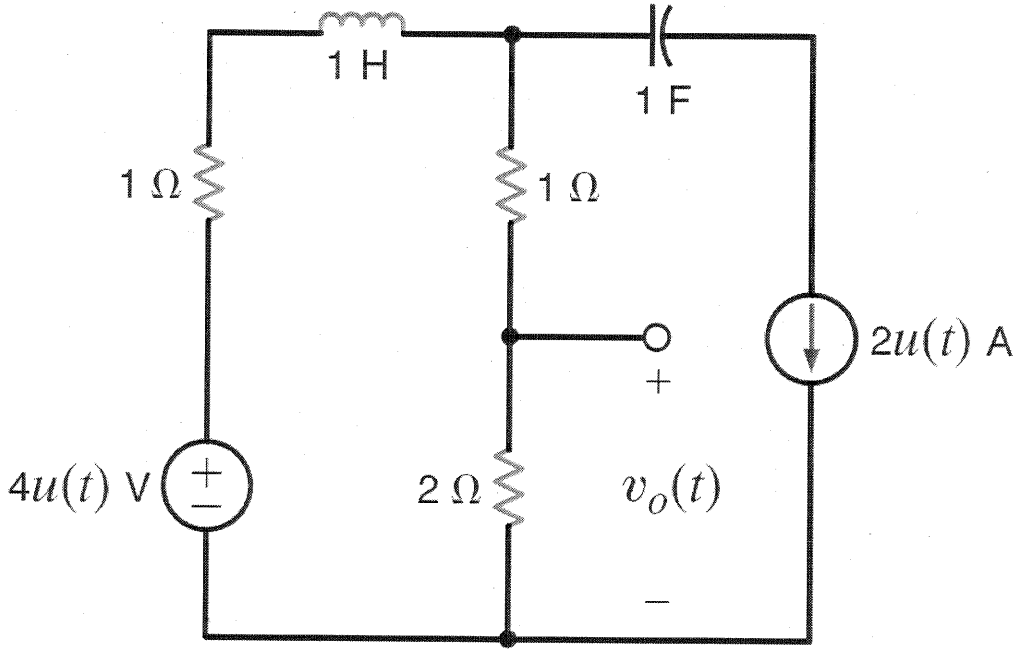
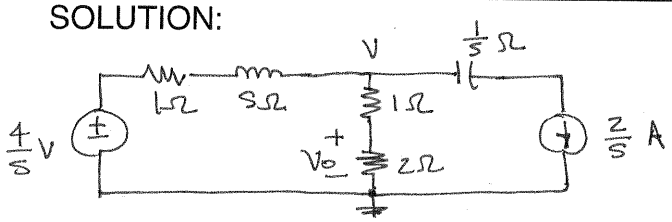


Figure P14.10

SOLUTION:



$$\frac{V - 4/s}{s+1} + \frac{V}{3} + \frac{2}{s} = 0$$

$$V\left[\frac{1}{s+1} + \frac{1}{3}\right] = \frac{4}{s(s+1)} - \frac{2}{s}$$

$$V\left[\frac{3 + s + 1}{3(s+1)}\right] = \frac{-2s + 2}{s(s+1)} \Rightarrow \quad V(s) = \frac{6(-s+1)}{s(s+4)} \qquad V_o = \frac{2}{3}V$$

$$V_o(s) = \frac{4(-s+1)}{s(s+4)} = \frac{1}{s} - \frac{5}{s+4}$$

$$\boxed{v_o(t) = [1 - 5e^{-4t}]u(t)}$$