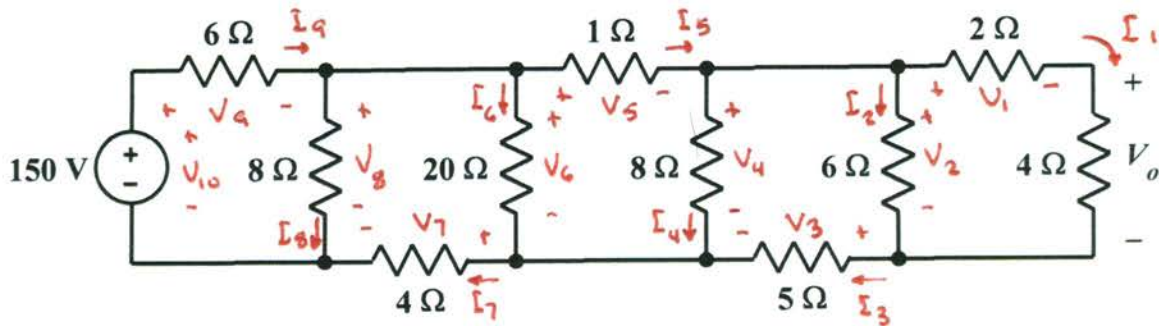


EE 2240  
**Problem #01**

Use linearity and proportionality, with an initial assumption that  $V_o = 40\text{ V}$ , to find  $V_o$ . Show the details of your work.



Assume  $V_o = 40\text{ V}$ .

Then  $I_1 = \frac{V_o}{4\Omega} = 10\text{ A} \Rightarrow V_1 = (2\Omega) I_1 = 20\text{ V}$

$V_2 = V_1 + V_o = 60\text{ V} \Rightarrow I_2 = \frac{V_2}{6\Omega} = 10\text{ A}$

$I_3 = I_2 + I_1 = 20\text{ A} \Rightarrow V_3 = (5\Omega) I_3 = 100\text{ V}$

$V_4 = V_2 + V_3 = 160\text{ V} \Rightarrow I_4 = \frac{V_4}{8\Omega} = 20\text{ A}$

$I_5 = I_3 + I_4 = 40\text{ A} \Rightarrow V_5 = (1\Omega) I_5 = 40\text{ V}$

$V_6 = V_5 + V_4 = 200\text{ V} \Rightarrow I_6 = \frac{V_6}{20\Omega} = 10\text{ A}$

$I_7 = I_5 + I_6 = 50\text{ A} \Rightarrow V_7 = (4\Omega) I_7 = 200\text{ V}$

$V_8 = V_6 + V_7 = 400\text{ V} \Rightarrow I_8 = \frac{V_8}{8\Omega} = 50\text{ A}$

$I_9 = I_7 + I_8 = 100\text{ A} \Rightarrow V_9 = (6\Omega) I_9 = 600\text{ V}$

$V_{10} = V_9 + V_8 = 1000\text{ V}$

$\frac{V_o}{1000\text{ V}} = \frac{40\text{ V}}{1000\text{ V}} \Rightarrow V_o = 40\text{ V}$