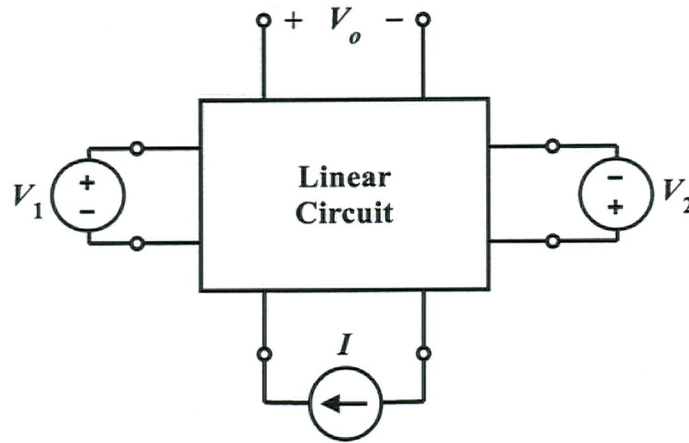


EE/EET 2240
Homework Problem #22



$V_o = 20\text{ V}$ when $V_1 = 2\text{ V}$, $I = 0\text{ A}$ and $V_2 = 2\text{ V}$.

$V_o = 30\text{ V}$ when $V_1 = 5\text{ V}$, $I = 2\text{ A}$ and $V_2 = 1\text{ V}$.

$V_o = 50\text{ V}$ when $V_1 = 6\text{ V}$, $I = 3\text{ A}$ and $V_2 = 5\text{ V}$.

What will V_o be when $V_1 = 4\text{ V}$, $I = 1\text{ A}$ and $V_2 = 3\text{ V}$?

Assume $V_o = K_1 V_1 + K_2 I + K_3 V_2$.

Then $2K_1 + 0K_2 + 2K_3 = 20$

$$5K_1 + 2K_2 + 1K_3 = 30$$

$$6K_1 + 3K_2 + 5K_3 = 50$$

In matrix form:

$$\begin{bmatrix} 2 & 0 & 2 \\ 5 & 2 & 1 \\ 6 & 3 & 5 \end{bmatrix} \begin{bmatrix} K_1 \\ K_2 \\ K_3 \end{bmatrix} = \begin{bmatrix} 20 \\ 30 \\ 50 \end{bmatrix}$$

Solving yields: $K_1 = 6$, $K_2 = -2$, $K_3 = 4$

Then $V_o = 6V_1 - 2I + 4V_2 = (6)(4\text{V}) + (-2)(1\text{A}) + (4)(3\text{V})$
 $= 34\text{ V}$