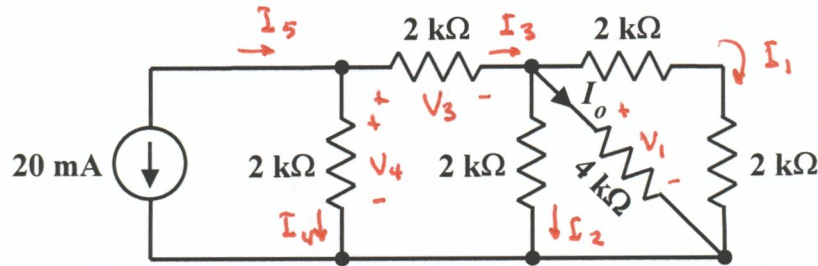


EE 2240
Problem #02

Find I_o using linearity and proportionality, and the assumption that $I_o = 1 \text{ mA}$. Show the details of your work.



Assume $I_o = 1 \text{ mA}$

Then $V_1 = (4 \text{ k}\Omega)(1 \text{ mA}) = 4 \text{ V}$

$$I_1 = \frac{V_1}{2 \text{ k}\Omega + 2 \text{ k}\Omega} = 1 \text{ mA}$$

$$I_2 = \frac{4 \text{ V}}{2 \text{ k}\Omega} = 2 \text{ mA}$$

$$I_3 = 4 \text{ mA}$$

$$V_3 = (2 \text{ k}\Omega)(4 \text{ mA}) = 8 \text{ V}$$

$$V_4 = V_3 + V_1 = 12 \text{ V}$$

$$I_4 = \frac{V_4}{2 \text{ k}\Omega} = 6 \text{ mA}$$

$$I_5 = I_3 + I_4 = 4 \text{ mA} + 6 \text{ mA} = 10 \text{ mA}$$

$$\frac{I_o}{20 \text{ mA}} = \frac{1 \text{ mA}}{-10 \text{ mA}} \Rightarrow I_o = -2 \text{ mA}$$