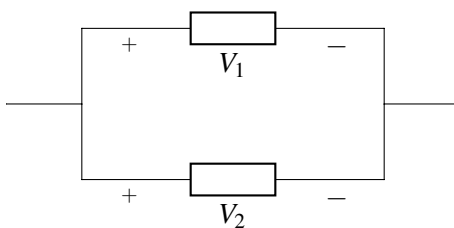


EECS 16A Designing Information Devices and Systems I

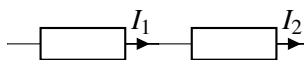
Summer 2020 Discussion 5D

1. Circuits Intuition Practice

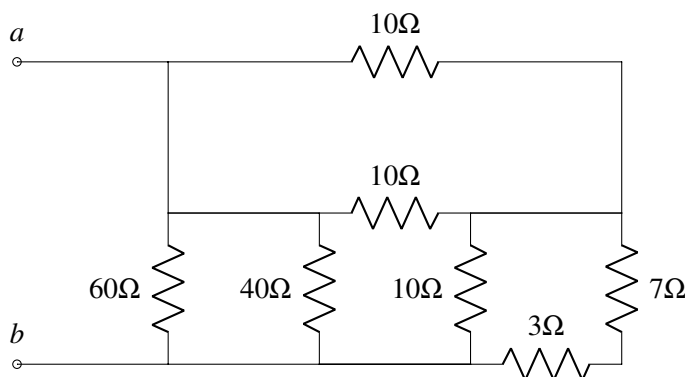
- (a) What does KVL tell you about V_1 and V_2 for any elements connected to the same pair of nodes?



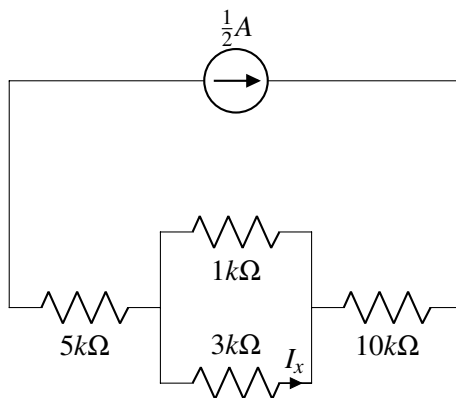
- (b) What does KCL tell you about I_1 and I_2 for any two elements connected to a node with nothing else connected to that node?



- (c) Find R_{ab} , the equivalent resistance between terminals a and b . Give your answer as a number, or an expression involving no more than one use of $||$.



- (d) Find I_x . (Hint: Can you see the current divider?)



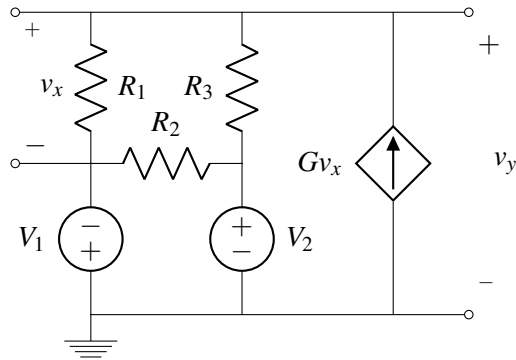
2. Take Node of the Voltage Sources

Use nodal analysis to solve for the voltages v_x and v_y . Use the following values for numerical calculations.

Note the polarity on the voltage sources.

Aside: S refers to the unit “Siemens” which is equal to $1/\Omega$ (essentially measures conductance instead of resistance). Don’t let this unit scare you.

$$\begin{aligned} V_1 &= 5\text{ V} & R_1 &= 10\ \Omega \\ V_2 &= 5\text{ V} & R_2 &= 50\ \Omega \\ G &= \frac{1}{4}\text{ S} & R_3 &= 40\ \Omega \end{aligned}$$



3. Practice: Equivalence

Find the Thévenin equivalent of the following circuit across the terminals a and b (in terms of V_s and β). Note that the current source is dependent on the current I_x .

