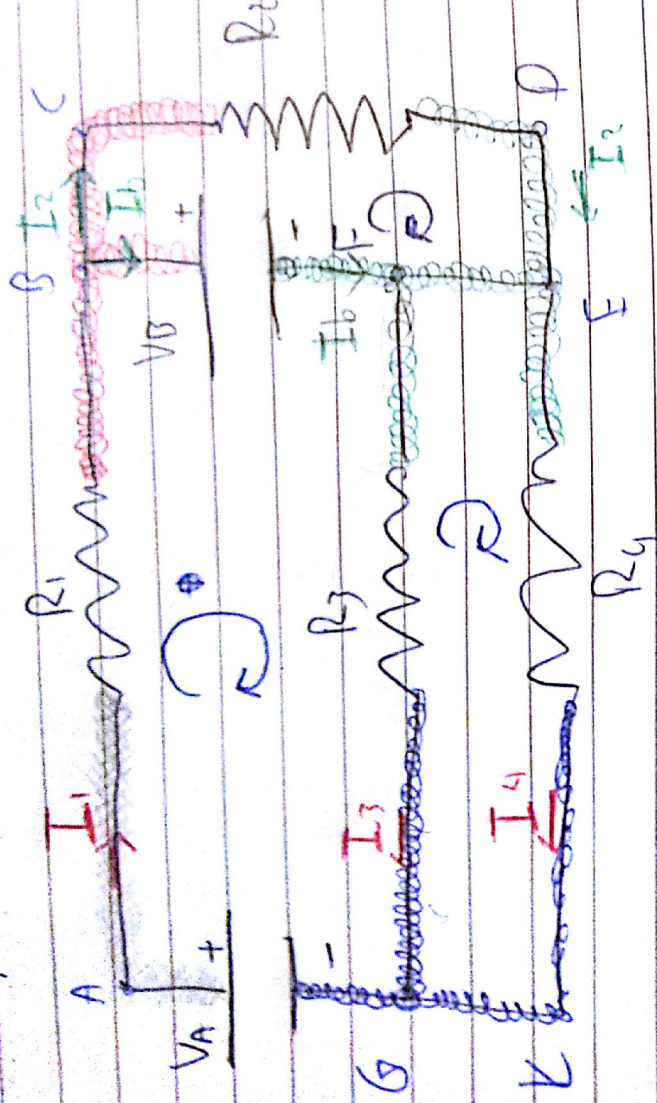


In circuit



Resistances  $\leftarrow$  (currents)

$R_1$   $I_1$   
 $R_2$   $I_2$   
 $R_3$   $I_3$   
 $R_4$   $I_4$

$\sigma$   $V_B$  is directly connected to the resistance  $R_2$   
 so by applying ohm's law we get:

$$V_B = R_2 I_2 \Rightarrow I_2 = \frac{5}{9} \text{ mA}$$

I take the loop A B F G A and I apply Kirchhoff's loop law. I get:

$$20 - 5 = I_1 R_1 + I_3 R_3 \Rightarrow 15 = 3I_1 + 6I_3 \quad (1)$$

About node G:  $I_4 R_4 - I_3 R_3 = 0 \Rightarrow 7I_4 - 6I_3 = 0 \quad (2)$

About node G:  $I_3 + I_4 = I_2 \quad (4)$

About node B:  $I_1 = I_2 + I_6 \Rightarrow I_1 = \frac{5}{9} + I_6 \quad (3)$

About node E:  $I_4 - I_6 + I_7 \Rightarrow I_4 - I_6 + \frac{5}{9} = 0 \quad (5)$



~~$I_1 = \frac{5}{4} A$~~

(4)  $I_4 = I_1 - I_3$

~~$2I_1 - 6I_4 = 0 \Rightarrow I_4 = 6I_1$~~

(\*)

(2)  $7I_1 - 7I_3 - 6I_4 = 0 \Rightarrow$

$7I_1 = 13I_3 \Rightarrow$

$I_3 = \frac{7}{13} I_1$

(1)  $15 = 3I_1 + \frac{42}{13} I_1 \Rightarrow 15 = \frac{(39+42)}{13} I_1$

$\Rightarrow I_1 = \frac{81}{195} \text{ mA}$

So  $I_3 = \frac{567}{2535} \text{ mA}$

$I_4 = \frac{81}{195} - \frac{567}{2535} = \frac{20535 - 11050}{194325}$

So  $I_1 \approx 0,415385 \text{ mA}$

$I_3 \approx 0,5555 \text{ mA}$

$I_4 \approx 0,223686 \text{ mA}$

$I_4 \approx 0,191716 \text{ mA}$