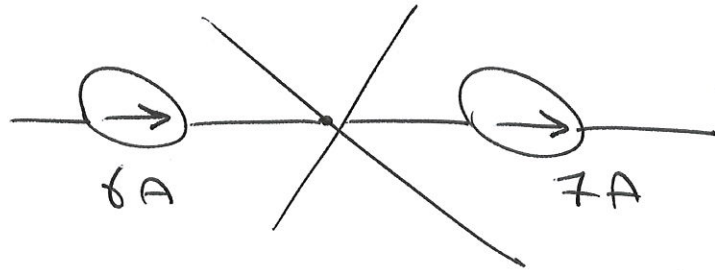


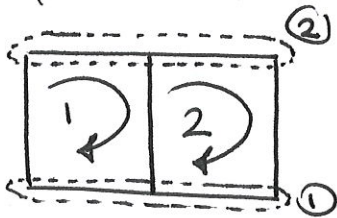
## Current Sources in Series

current sources of different current rating are not connected in series.



## Branch-Current analysis

(2 node)

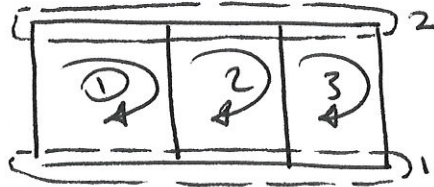


two loop.  
KVL: 2 eqns

2 node

$2 - 1 = 1 \text{ eq}$   
KCL

(2 node)

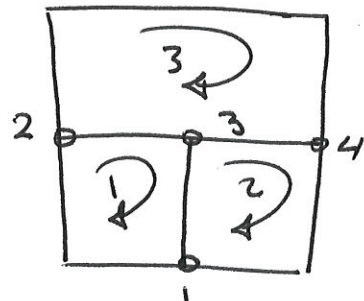


three loop  
KVL: 3 eq

2 node

$2 - 1 = 1 \text{ eq}$   
KCL

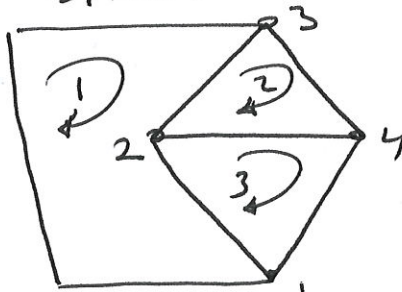
(4 node)



three loop  
KVL: 3 eq

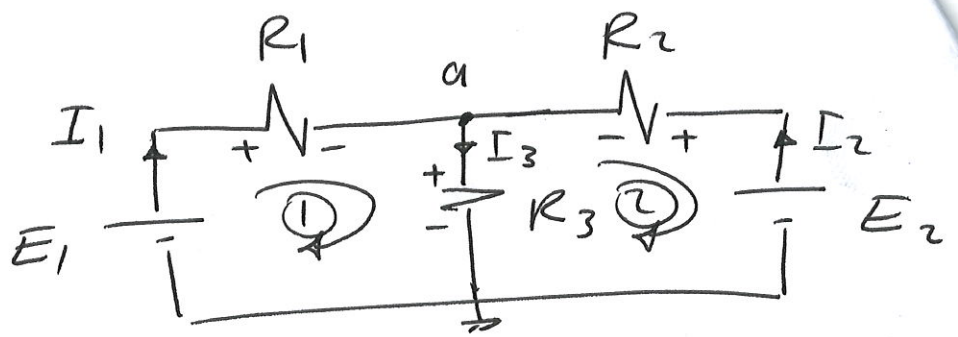
$4 - 1 = 3 \text{ eq}$   
KCL

(4 node)



three loop  
KVL = 3 eq

4 node  
 $4 - 1 = 3 \text{ eq}$   
KCL



KCL at node a:

$$I_1 + I_2 = I_3 \quad \text{--- (1)}$$

KVL at ~~node~~ loop (1):

$$+E_1 - I_1 R_1 - I_3 R_3 = 0 \quad \text{--- (2)}$$

KVL at loop (2):

$$-E_2 + I_3 R_3 + I_2 R_2 = 0 \quad \text{--- (3)}$$

نتم حل المعادلات الثلاثة لإيجاد قيم التيارات

Ex Find  $I_1, I_2$  &  $I_3$ ?

Sol

at node a:

$$I_1 + I_2 = I_3 \quad \text{--- (1)}$$

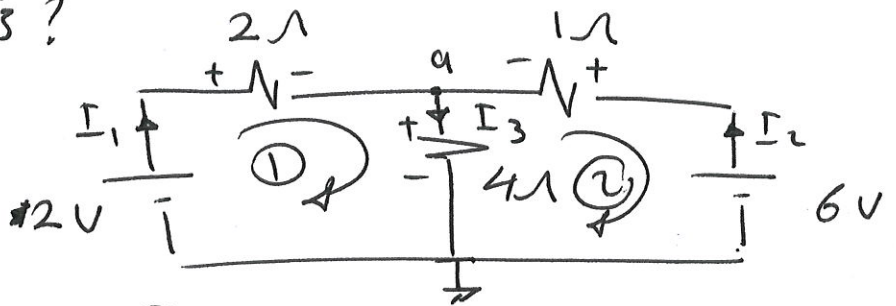
KVL at loop (1):

$$2 - 2I_1 - 4I_3 = 0 \quad \text{--- (2)}$$

KVL at loop (2):

$$-6 + 4I_3 + 1I_2 = 0 \quad \text{--- (3)}$$

نعوض عن  $I_3$  من (1) في (2) & (3)



① into ②

$$2 - 2I_1 - 4(I_1 + I_2) = 0$$

$$2 - 6I_1 - 4I_2 = 0 \quad \text{--- (4)}$$

① into ③

$$-6 + 4(I_1 + I_2) + I_2 = 0$$

$$-6 + 4I_1 + 5I_2 = 0 \quad \text{--- (5)}$$

من معادله (4) نوبه  $I_2$  و نفوفاً (5)

$$I_2 = \frac{2 - 6I_1}{4}$$

$$-6 + 4I_1 + 5\left(\frac{2 - 6I_1}{4}\right) = 0$$

$$-6 + 4I_1 + \frac{10 - 30I_1}{4} = 0 \quad * 4$$

$$-24 + 16I_1 + 10 - 30I_1 = 0$$

$$\therefore I_1 = \underline{\underline{-1A}}$$

$$I_2 = \frac{2 - 6(-1)}{4} = \underline{\underline{2A}}$$

$$I_3 = -1 + 2 = \underline{\underline{1A}}$$