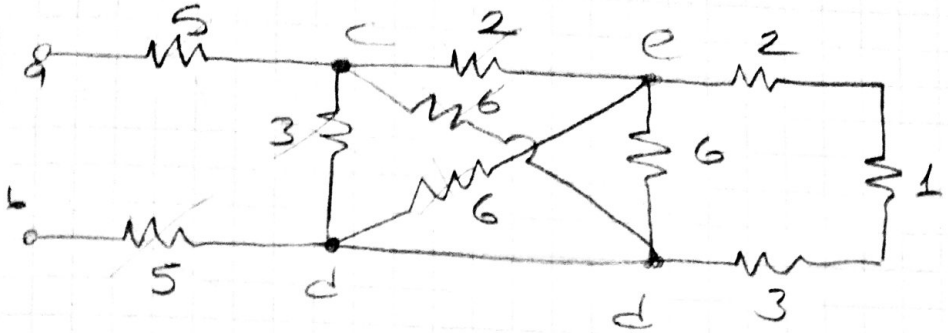
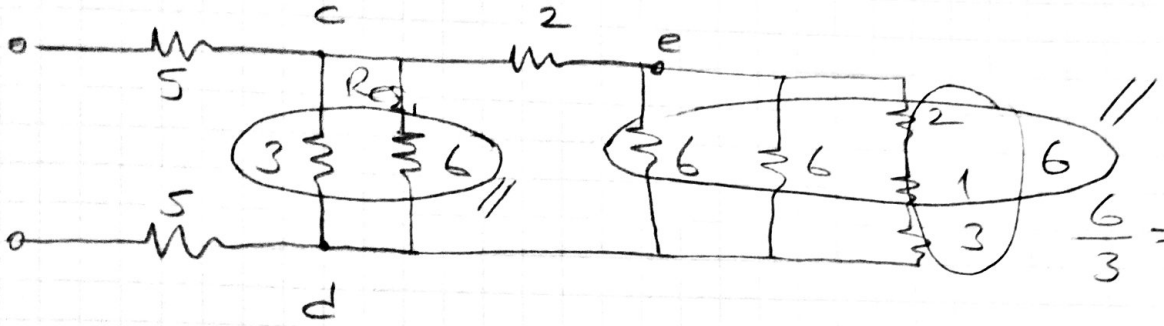
Örnek

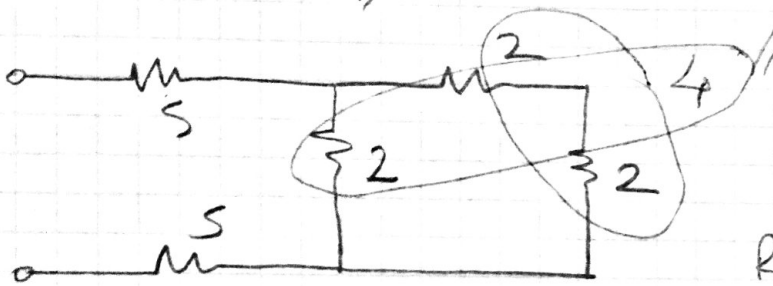


$R_{ab} = ?$



$\frac{6}{3} = 2\,\Omega$

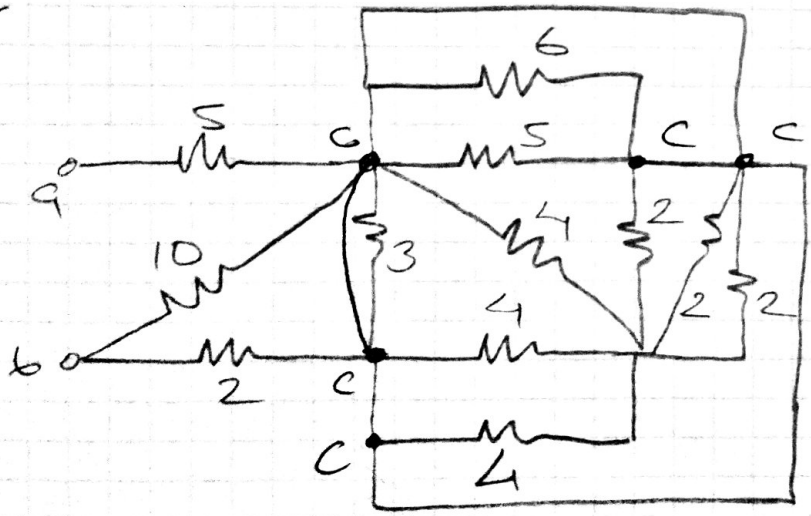
$R_{eq_1} = \frac{3 \cdot 6}{9} = 2$



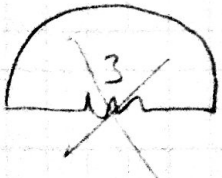
$R_{eq_2} = \frac{4 \cdot 2}{6} = \frac{4}{3}$

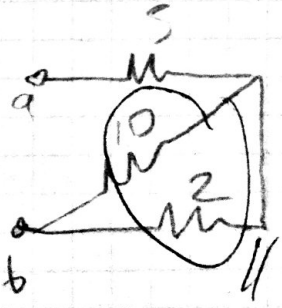
$R_{ab} = 5 + 5 + \frac{4}{3} = \frac{34}{3}\,\Omega$

Örnek



$R_{ab} = ?$





$R_{eq_1} = \frac{10 \cdot 2}{12} = \frac{5}{3}$

$R_{eq_1} = 5/3$

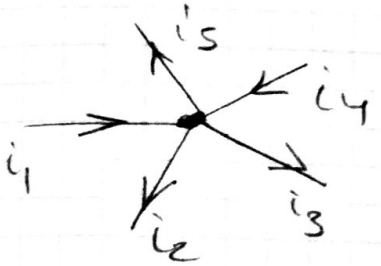
$R_{ab} = 5 + R_{eq_1}$

$= 5 + \frac{5}{3} = \frac{20}{3}\,\Omega$

2.3) Kirchhoff Yasaları

2.3.1) Kirchhoff'un akım yasası (KCL)

Bir düğüme giriş ve çıkış yapan akımların cebirsel toplamı sıfıra eşittir



$$\sum_{n=1}^{N} i_n = 0$$

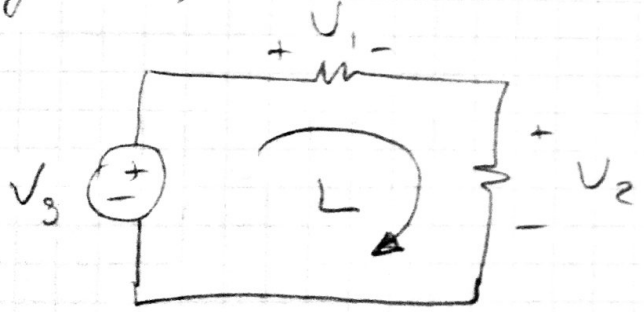
giren −
çıkan +

$$-i_1 - i_4 + i_2 + i_3 + i_5 = 0$$

$$i_5 + i_2 + i_3 = i_4 + i_1$$

2.3.2) Kirchhoff'un gerilim yasası (KVL)

Kapalı bir döngüdeki gerilimlerin toplamı sıfırdır.

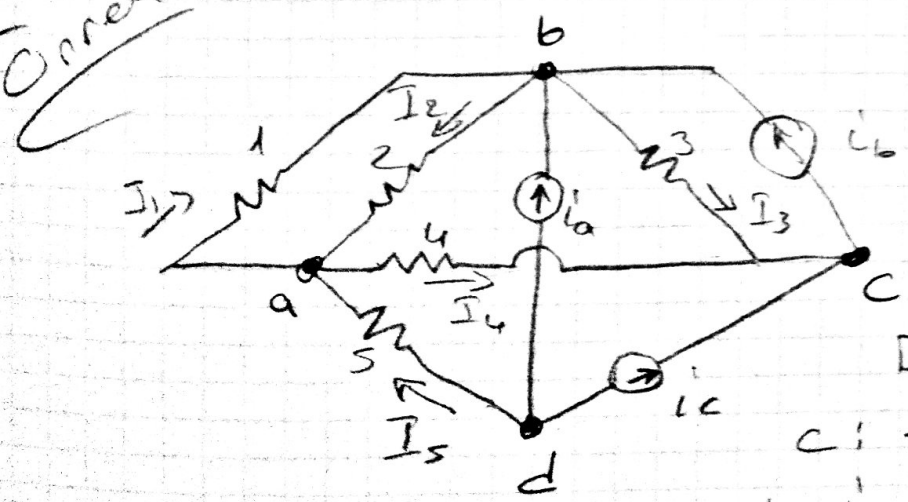


L döngüsü için

$$-V_S + V_1 + V_2 = 0$$

$$V_S = V_1 + V_2$$

Örnek



KCL

Düğüm a (node a):

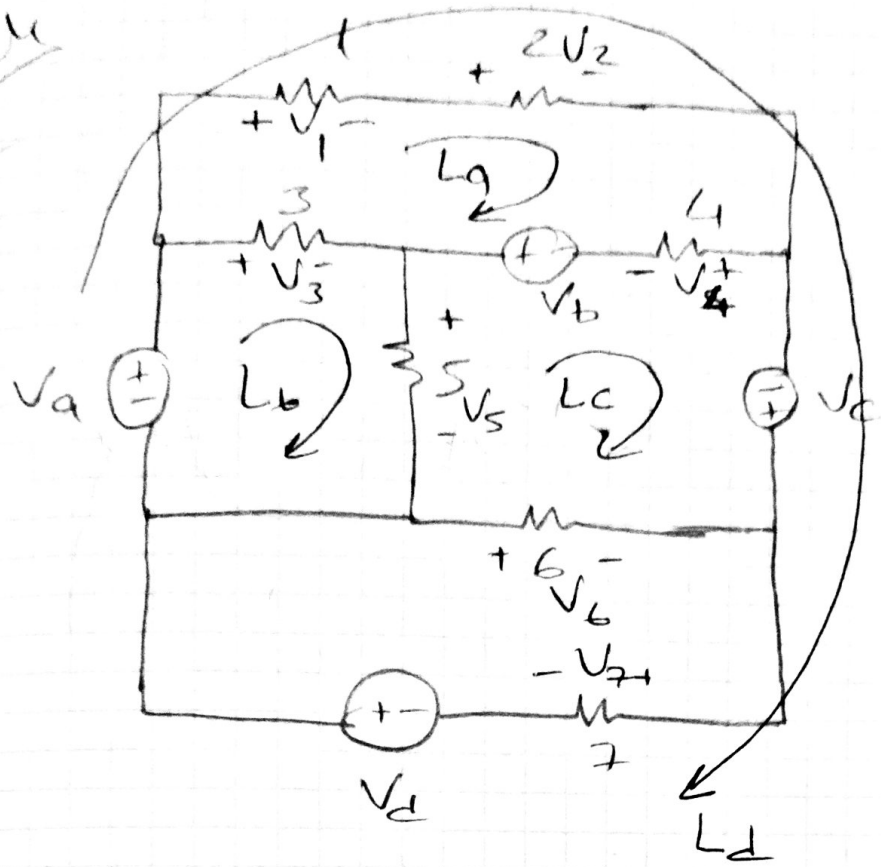
$$I_1 - I_2 + I_4 - I_5 = 0$$

Düğüm b: $-I_1 + I_2 - i_a + I_3 - i_b = 0$

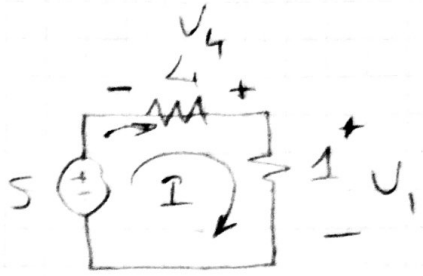
c: $-i_c + i_b - I_4 - I_3 = 0$

d: $i_c + i_a + I_5 = 0$

Örnek



KVL



$-5 - V_4 + V_1 = 0$

$V = IR$

$5 = I \cdot 5$

$I = 1A$

$V_4 = -1.4$

$V_1 = -4V$

$V_1 = 1,1 = 1V$

$-5 - (-4) + 1 = 0$

$-5 + 4 + 1 = 0$

Göz a / a döngüsü

$-V_3 + V_1 + V_2 + V_4 - V_6 = 0$

b Dayüsü

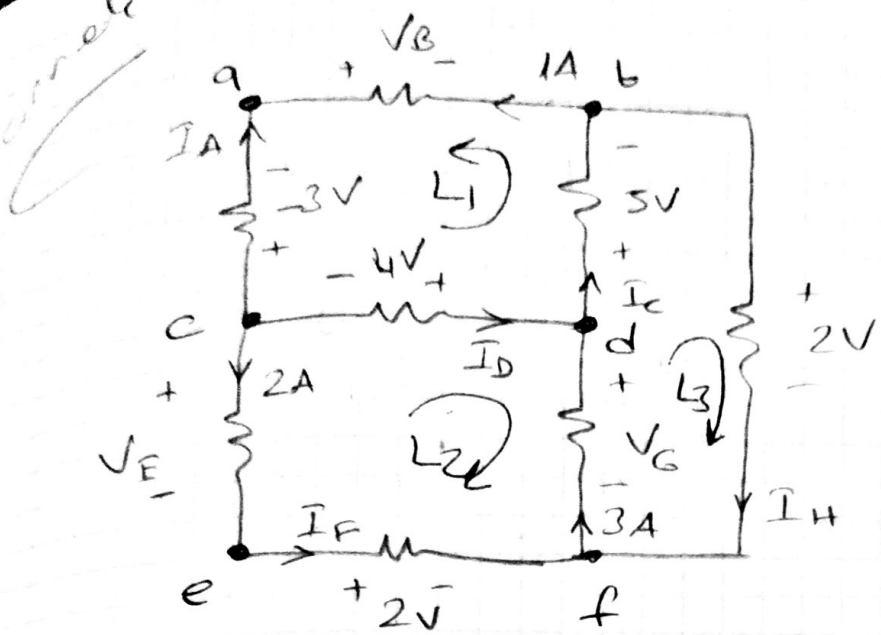
$-V_a + V_3 + V_5 = 0$

c döngüsü

$-V_b - V_5 + V_6 - V_4 - V_c = 0$

d döngüsü

$-V_a + V_1 + V_2 - V_c + V_7 - V_d = 0$



KCL

düğüm a

$-I_A - 1 = 0$

$I_A = -1A$

düğüm b

$1 + I_H - I_C = 0$

$I_C = 2A$

düğüm e : $-2 + I_F = 0$

$I_F = 2A$

düğüm f :

$3 - 2 - I_H = 0$

$I_H = 1A$

düğüm c : $2 + I_D + I_A = 0$

$I_D = -1A$

KVL

L1 için

$5 - V_B - (-3) - 4 = 0$

$V_B = 4V$

L2 için

$-4 + V_G - 2 - V_E = 0$

$V_G - V_E = 6V$

$7 - V_E = 6$

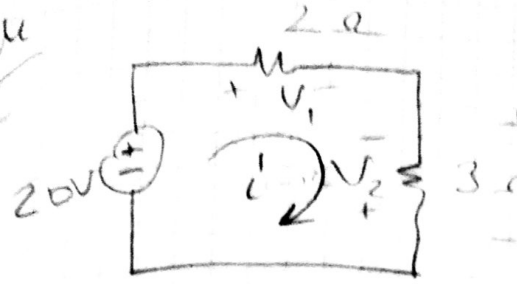
$V_E = 1V$

L3 için

$-V_G + 5 + 2 = 0$

$V_G = 7V$

Örnek



V_1 ve V_2 = ?

$-20 + V_1 - V_2 = 0$

$V_1 = i2$
$V_2 = -i3$ $\Rightarrow$ $-20 + 2i - (-3i) = 0$

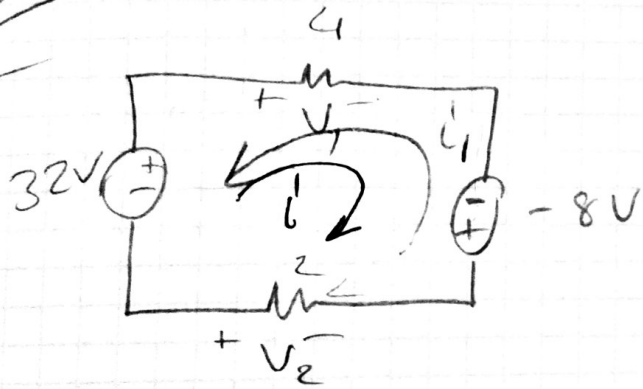
$5i = 20$

$i = 4\,A$

$V_1 = 2i = 8V$

$V_2 = -3i = -12V$

Örnek



V_1 , V_2 = ?

i)

$-32 + V_1 - (-8) - V_2 = 0$

$V_1 - V_2 = 24V$

$4i - (-2i) = 24$

$6i = 24 \quad i = 4\,A$

$V_1 = 4i = 16V$
$V_2 = -i2 = -8V$

ii) $-8 - V_1 + 32 + V_2 = 0$

$V_2 - V_1 = -24V$

$2i_1 - (-4i_1) = -24$ $\rightarrow$ $6i_1 = -24 \quad i_1 = -4$

$V_1 = 4i_1 = 16V$
$V_2 = 2i_1 = -8V$