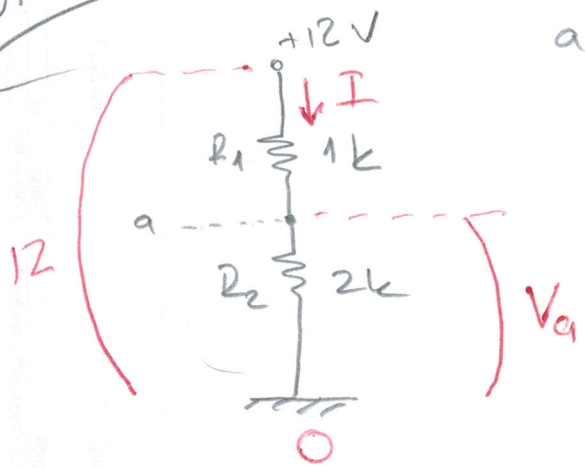
Örnek



a noktasındaki gerilim V_a nedir?

$V = \frac{I}{?} \cdot R$ ✓

$V = I R$

$12 = I \cdot R_{eş}$

$R_{eş} = R_1 + R_2$

$= 1.10^3 + 2.10^3$

$= 3.10^3\ \Omega$

$= 3k\Omega$

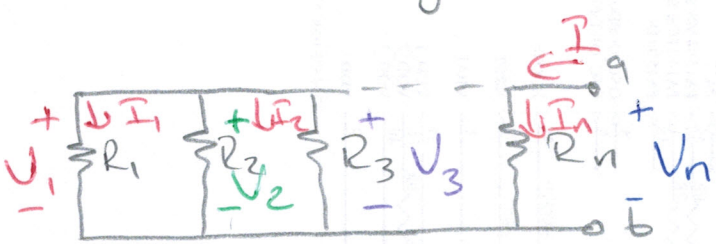
$I = \frac{12}{R_{eş}} = \frac{12}{3.10^3} = 4.10^{-3}$

$= 4\,mA$

$V_a = I \cdot R_2$

$V_a = 4.10^{-3} \cdot 2.10^3 = 8V$

2) Paralel Bağlantı



ab noktasından bakıldığında görünen toplam direnç yani eşdeğer direnç;

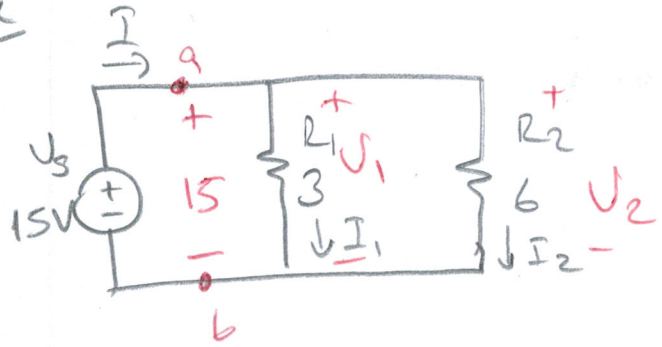
$$\frac{1}{R_{eş}} = \frac{1}{R_1} + \frac{1}{R_2} - - - - + \frac{1}{R_n}$$

Paralel Bağlı tüm dirençler üzerinde aynı gerilim düşümü meydana gelir. Yani

$$V_1 = V_2 = V_3 - - - - - = V_n = V_{ab}$$

$$I = I_1 + I_2 + I_3 - - - + I_n$$

Örnek



I_1 , I_2 = ?

$V_s = V_{ab} = V_1 = V_2 = 15V$

$V = IR \Rightarrow V_2 = I_2 . R_2$

$15 = I_2 . 6$

$I_2 = \frac{15}{6} = 2,5A$

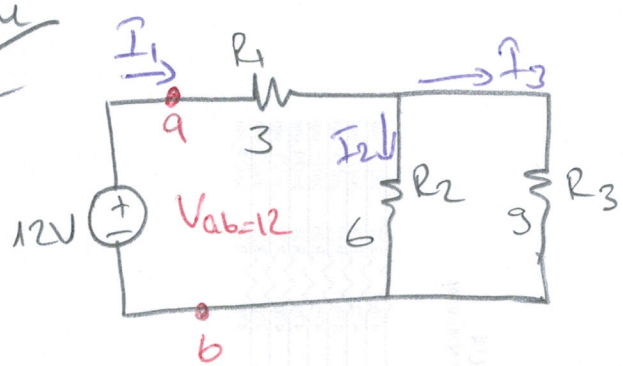
$V_1 = I_1 R_1$

$15 = I_1 . 3$

$I_1 = \frac{15}{3} = 5A$

$I = I_1 + I_2 = 5 + 2,5 = 7,5A$

Örnek

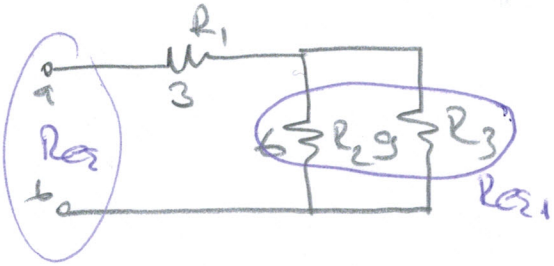


V_1 , V_2 , V_3 = ?

$I_1 = I_2 + I_3$

$V_1 = I_1 R_1$ $\quad V_2 = I_2 R_2$ $\quad V_3 = I_3 . R_3$

$V = IR \Rightarrow 12 = I_1 . R_{es}$



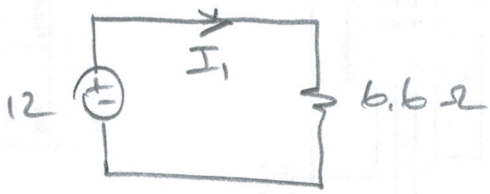
$R_{es} = R_1 + R_{es_1}$

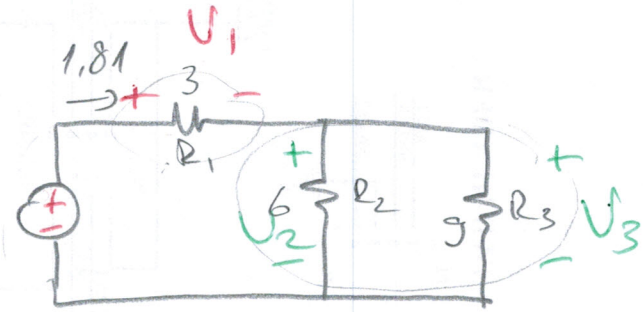
$\frac{1}{R_{es_1}} = \frac{1}{R_1} + \frac{1}{R_2} \Rightarrow R_{es_1} = \left(\frac{1}{R_1} + \frac{1}{R_2}\right)$

$$Req_1 = \left(\frac{1}{\frac{6}{3}} + \frac{1}{\frac{9}{2}}\right)^{-1} = \left(\frac{3+2}{18}\right)^{-1} = 3{,}6\ \Omega$$

$$Req_2 = R_1 + Req_1 = 3 + 3{,}6 = 6{,}6\ \Omega$$

$$I_1 = \frac{12}{Req_2} = \frac{12}{6{,}6} = 1{,}81\ A$$





$$V_1 = I_1 \cdot R_1 = 1{,}81 \cdot 3 = 5{,}43\ V$$

$$V_2 = V_3 \rightarrow 12 - V_1 = V_2 = V_3$$

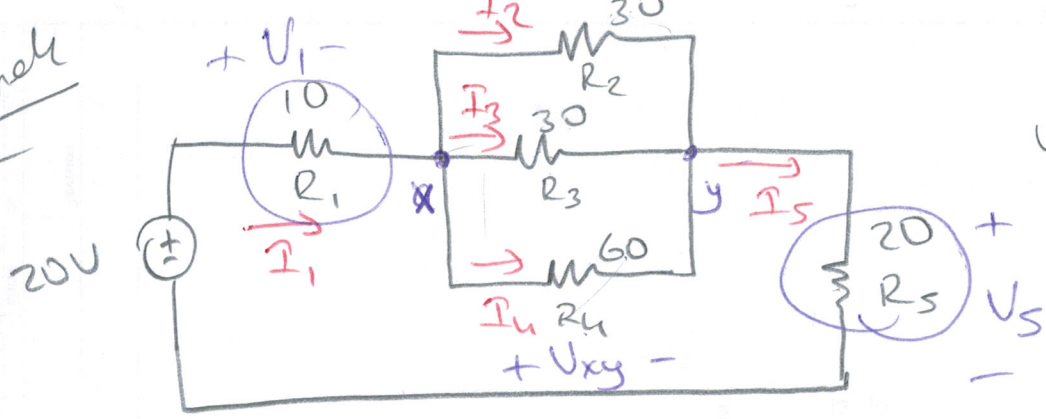
$$V_2 = V_3 = 12 - 5{,}43 = 6{,}57\ V$$

$$I_2 = \frac{V_2}{R_2} = \frac{6{,}57}{6} = 1{,}095\ A$$

$$I_3 = \frac{V_3}{R_3} = \frac{6{,}57}{9} = 0{,}73\ A$$

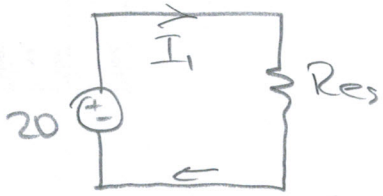
$$I_1 - I_2 = I_3 = 0{,}715\ A$$

Örnek



$V_1, V_2, V_3, V_4, V_5 = ?$

$$I_1 = I_2 + I_3 + I_4 = I_5$$



$$R_{eq} = R_1 + (R_2 // R_3 // R_4) + R_5$$

$$= 10 + \left(\frac{1}{30} + \frac{1}{30} + \frac{1}{60}\right)^{-1} + 20$$

$$= 10 + \left(\frac{2+2+1}{60}\right)^{-1} + 20$$

$$R_{eq} = 42\ \Omega$$

$$I_1 = \frac{U}{R_{eq}}$$

$$I_1 = \frac{20}{42} = 0{,}47A$$

$$I_1 = I_5 = 0{,}47A$$

$$V_1 = I_1 \cdot R_1 = 0{,}47 \cdot 10 = 4{,}7V$$

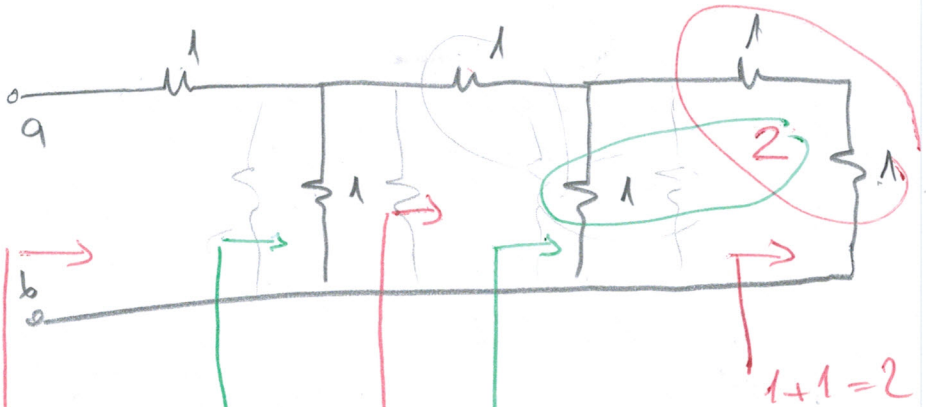
$$V_5 = I_5 \cdot R_5 = 0{,}47 \cdot 20 = 9{,}4V$$

$$V_{xy} = 20 - V_1 - V_5 = 20 - 4{,}7 - 9{,}4 = \underline{5{,}9V}$$

$$I_2 = \frac{5{,}9}{30} = 0{,}19A = I_3 \qquad I_4 = \frac{5{,}9}{60} = 0{,}095A$$

$$V_2 = V_3 = V_4 = 5{,}9V$$

Örnek



$R_{ab} = ?$

$1 + 1 = 2$

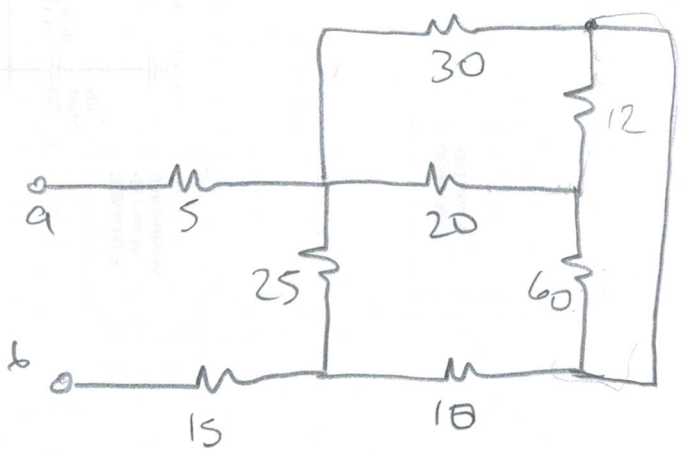
$1 // 2 = 2/3$

$1 + 2/3 = 5/3$

$\frac{5}{3} // 1 = \frac{5}{8}$

$1 + 5/8 = \frac{13}{8}$

Örnek

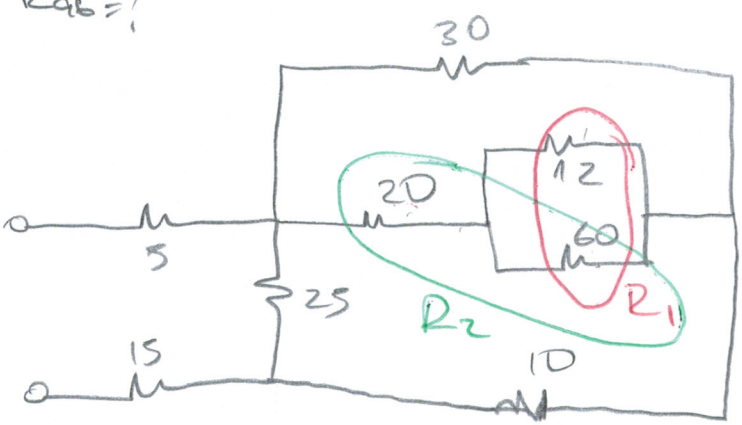


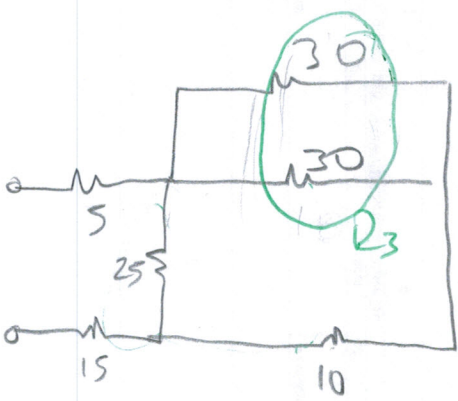
$R_{ab} = ?$

$R_1 = \left(\frac{1}{12} + \frac{1}{60}\right)^{-1}$

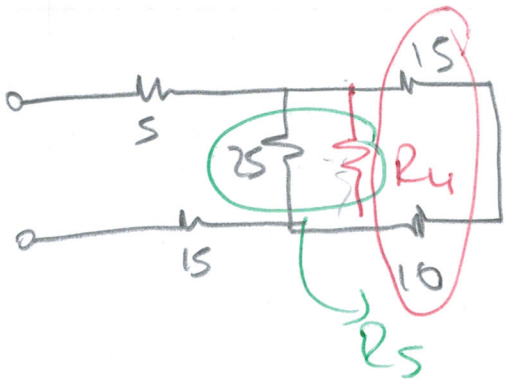
$R_1 = \frac{c}{T} = \frac{12 \cdot 60}{72} =$

$R_2 = R_1 + 20 = 30$



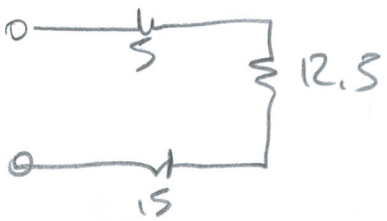


$R_3 = \frac{30 \cdot 30}{60} = 15$



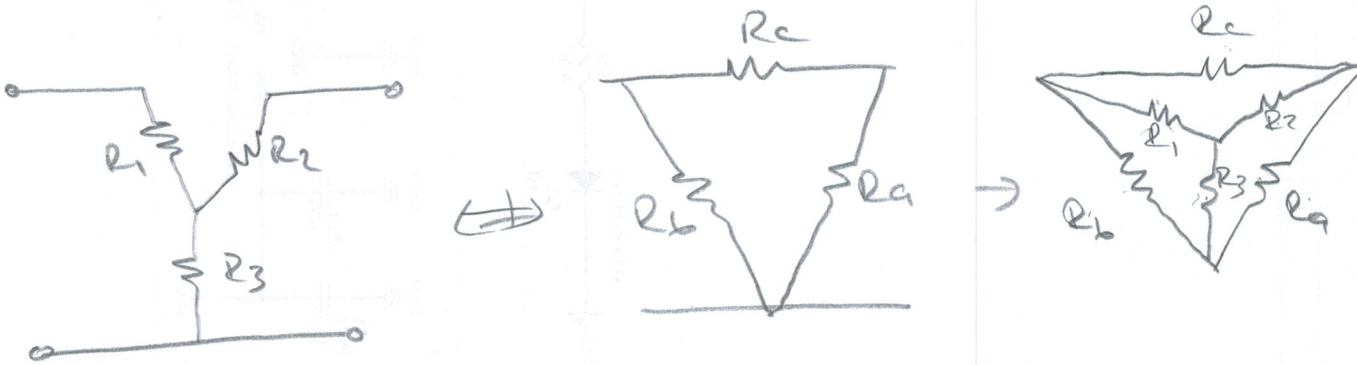
$R_4 = 15 + 10 = 25$

$R_5 = 25 // 25 = 12{,}5\ \Omega$



$R_{ab} = 5 + 12{,}5 + 15 = 32{,}5\ \Omega$

- Yıldız - Üçgen Dönüşümleri:

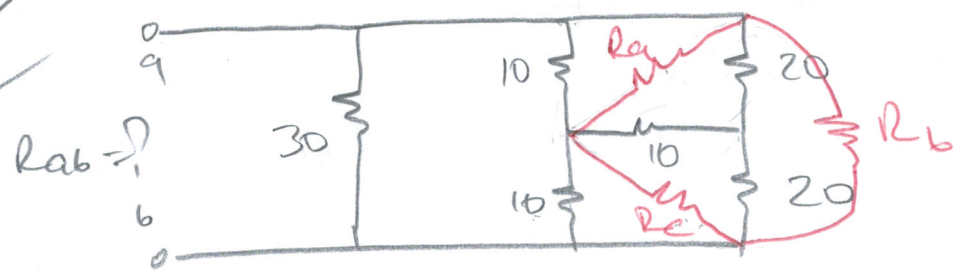


$$R_1 = \frac{R_b R_c}{R_a + R_b + R_c} \qquad R_2 = \frac{R_c R_a}{R_a + R_b + R_c} \qquad R_3 = \frac{R_a R_b}{R_a + R_b + R_c}$$

$$R_a = \frac{R_1 R_2 + R_2 R_3 + R_3 R_1}{R_1} \qquad R_b = \frac{R_1 R_2 + R_2 R_3 + R_3 R_1}{R_2}$$

$$R_c = \frac{R_1 R_2 + R_2 R_3 + R_3 R_1}{R_3}$$

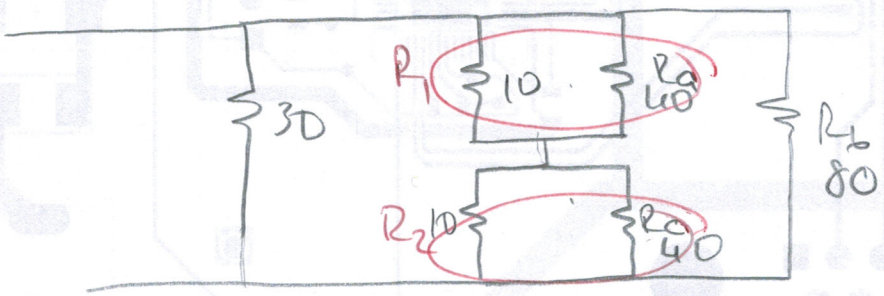
Ölmek



$$R_a = \frac{20.20 + 20.10 + 10.20}{20} = 40\,\Omega$$

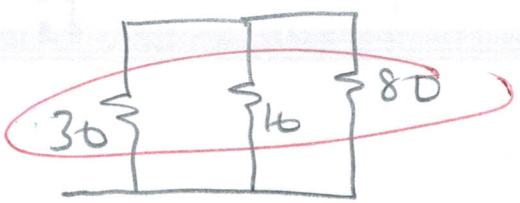
$$R_b = \frac{20.20 + 20.10 + 10.20}{10} = 80\,\Omega$$

$$R_c = \frac{20.20 + 20.10 + 20.10}{20} = 40\,\Omega$$



$$R_1 = \frac{10.40}{50} = 8\,\Omega$$

$$R_2 = 8\,\Omega$$



$$R_{es} = \left(\frac{1}{30} + \frac{1}{16} + \frac{1}{80}\right)^{-1} = 9{,}22\,\Omega$$

$$R_{es_1} = \left(\frac{1}{30} + \frac{1}{80}\right)^{-1}$$

$$R_{es} = R_{es_1} \,//\, 16$$