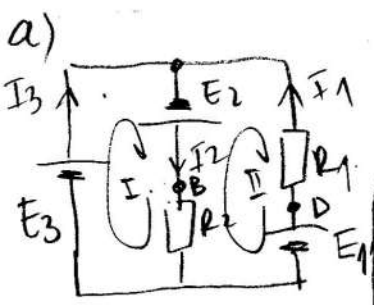
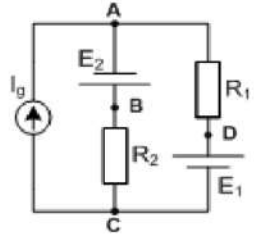
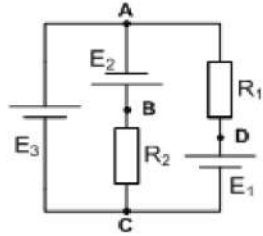


U kolu na slici, primenom metode konturnih struja, odrediti intenzitete struja u svim granama i napon U_{BD} . Poznato je: $E_1 = 6V$, $E_2 = 2V$, $E_3 = 10V$, $R_1 = 10\Omega$ i $R_2 = 20\Omega$, $I_g = 2A$.



MKC - u3 IIk3!

$n_g - m_c + 1 = 2 \Rightarrow 2 \times 2$

$$\text{I) } R_{11} I_I + R_{12} I_{II} = E_I$$

$$\text{II) } R_{21} I_I + R_{22} I_{II} = E_{II}$$

КОИТИПЕ СЕ БАРАЏУ
20Ω, КАД 3А IIk3.
ПРОВОЗВОЈАНО(?)

$R_{11} = R_2, R_{12} = R_{21} = -R_2, R_{22} = R_1 + R_2$

$E_I = E_3 + E_2, E_{II} = -E_2 + E_1$

$$\text{I) } R_2 I_I - R_2 I_{II} = E_3 + E_2$$

$$\text{II) } -R_2 I_I + (R_1 + R_2) I_{II} = -E_2 + E_1$$

$$20 I_I - 20 I_{II} = 12$$

$$-20 I_I + 30 I_{II} = -8$$

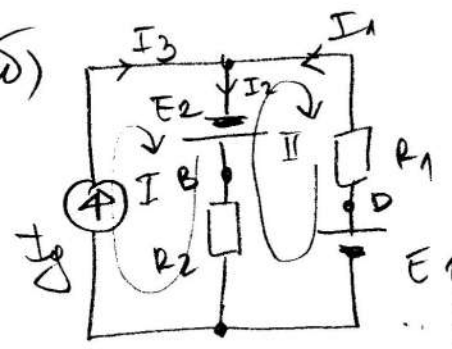
$I_{II} = 0,4 A, I_I = 1 A$

$I_1 = -I_{II} = -0,4 A$

$I_2 = I_I - I_{II} = 0,6 A$

$I_3 = I_I = 1 A$

$U_{BD} = -E_1 + R_2 I_2 = -6 + 20 \cdot 0,6 = 6 V$



$n_g - m_c + 1 = 2 \Rightarrow 2 \times 2$

$\Rightarrow 2$ КОИТИ. СТРАЈЕ! I_I, I_{II}

$$\text{I) } R_{11} I_I - R_{12} I_{II} = E_I$$

$$\text{II) } R_{21} I_I + R_{22} I_{II} = E_{II}$$

← НЕ МОЖЕ ЗБОГ $I_g \dots$

$\text{I) } I_I = I_g$

$[I_3 = I_I, I_3 = I_g]$

$R_{11} = -R_2, R_{22} = R_2 + R_1, E_{II} = -E_2 - E_1$

$\text{I) } I_I = I_g = 2 A$

$\text{II) } -R_2 I_I + (R_1 + R_2) I_{II} = -E_2 - E_1$

$$I_{II} = \frac{-E_2 - E_1 + R_2 I_g}{R_1 + R_2} = \frac{32}{30} = \frac{16}{15} A$$

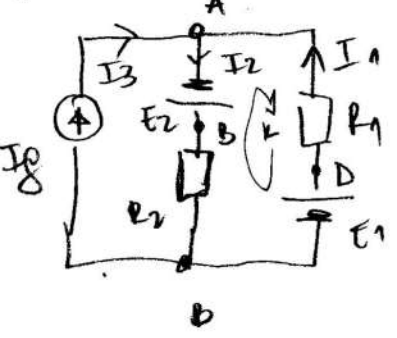
СТРАЈЕ У ГРАНАМА:

$(I_3 = I_g), I_2 = I_I - I_{II} = \frac{14}{15} A, I_1 = -I_{II} = -\frac{16}{15}$

$$U_{BD} = -R_1 I_1 + E_2 =$$

$$= -\frac{190}{15} = -\frac{38}{3} V$$

⊛ ДОДАТАК: Кирхофовим ЗАКОНИМА РЕШИТИ ПРЕТХОДНИ ЗАДАТАК!



$I_3 = I_g$ — НАСТАВНИ СТРУЈНИ ГЕНЕРАТОР
3 ГРАНЕ, 2 НЕП. СТРУЈЕ! $\Rightarrow 2 \times 2$

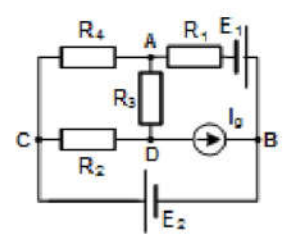
- (I) $n_1 - 1 = 1$
- (A) $I_g + I_1 - I_2 = 0$ (1)
- (II) $n_0 - n_0 + 1 - n_{I_g} = 1$
- (B) $R_2 I_2 - E_2 + R_1 I_1 - E_1 = 0$ (2)

$$R_2(I_g + I_1) - E_2 + R_1 I_1 - E_1 = 0 \Rightarrow I_1 = \frac{E_1 + E_2 - R_2 I_g}{R_1 + R_2} = -\frac{16}{15} A$$

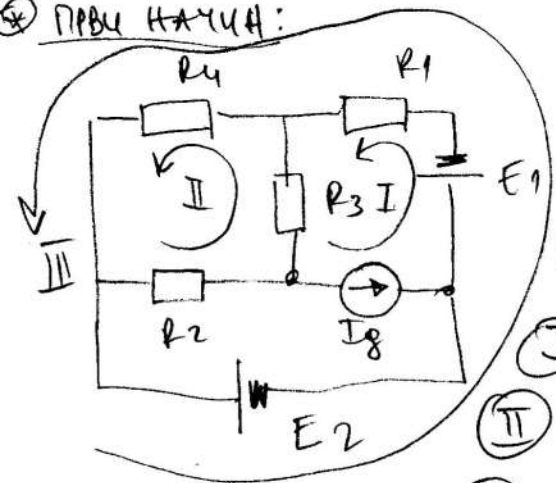
$$I_2 = I_1 + I_g = \frac{14}{15} A$$

$U_{BD} = \dots$

⊛ I. U kolu na slici, metodom Kontumih struja odrediti: (struje u svim granama), snagu strujnog generatora, P_{I_g} , snagu naponskog generatora P_{E_1} i snagu otpornika R_3, P_{R_3} . Poznato je: $E_1 = 60V$, $E_2 = 40V$, $I_g = 1A$, $R_1 = R_2 = R_3 = R_4 = 10\Omega$.



⊛ ПРВИ НАЧИН:

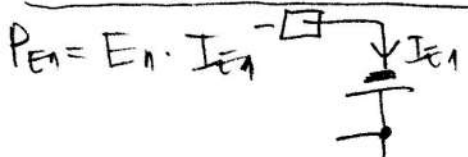


- $n_0 = n_0 + 1 = 3 \Rightarrow 3 \times 3$
- (I) $I_I = I_g$
- (II) $R_{21} I_I + R_{22} I_{II} + R_{23} I_{III} = E_{II}$
- (III) $R_{31} I_I + R_{32} I_{II} + R_{33} I_{III} = E_{III}$
- (I) $I_I = I_g = 1A$ ✓
- (II) $-R_3 I_I + (R_2 + R_3 + R_4) I_{II} + R_4 I_{III} = 0$
- (III) $R_1 I_I + R_4 I_{II} + (R_1 + R_4) I_{III} = -E_2 - E_1$

$$3 I_{II} + I_{III} = I_g = 1A$$

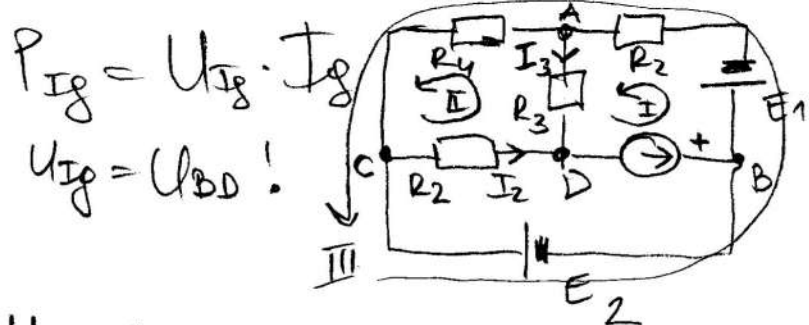
$$I_{II} + 2 I_{III} = \frac{-E_2 - E_1}{R} - I_g = -11A$$

$$I_{II} = \frac{13}{5} = 2,6A, \quad I_{III} = -6,8A, \quad I_I = I_g = 1A$$



$$I_{E_1} = -I_I - I_{III} = 5,8A \Rightarrow P_{E_1} = 348W$$

(2)



$$P_{I_3} = U_{I_3} \cdot I_3$$

$$U_{I_3} = U_{BD}!$$

$$P_{R3} = R_3 \cdot I_3^2$$

$$I_3 = I_I - I_{II} = -1,6 \text{ W}$$

$$P_{R3} = 25,6 \text{ W}$$

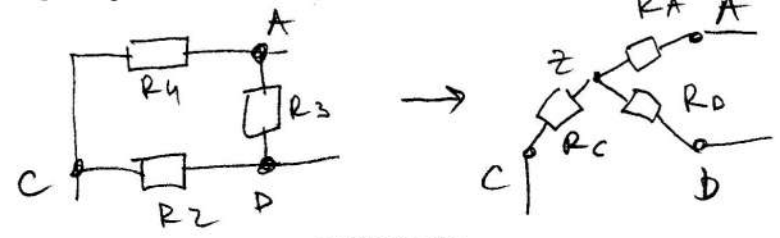
$$U_{BD} = R_2 I_2 - E_2$$

$$I_2 = I_{II} = 2,6 \text{ A}$$

$$U_{BD} = -14 \text{ V} \Rightarrow P_{I_3} = -14 \text{ W}$$

КРУГ И ТРОУГАО:

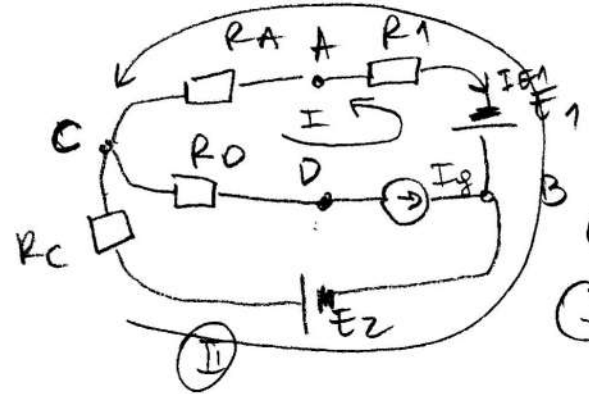
ЗВЕЗДА ↔ ТРОУГАО



$$R_A = \frac{R_4 \cdot R_3}{R_4 + R_3 + R_2} = \frac{R}{3}$$

$$R_D = \frac{R_2 \cdot R_3}{R_2 + R_3 + R_4} = \frac{R}{3}$$

$$R_C = \frac{R_2 \cdot R_4}{R_2 + R_4 + R_3} = \frac{R}{3}$$



$$M_A = 3, M_D = 2!$$

Ⓚ $I_I = I_3!$

Ⓛ $(R_A + R_A) I_I + (R_A + R_1 + R_C) I_{II} = -E_2 - E_1$

$$I_I = 1 \text{ A}$$

$$I_{II} = \frac{-E_1 - E_2 - (R_A + R_A) I_I}{R_A + R_1 + R_C} = \dots = -6,8 \text{ A}$$

$$P_{E1} = E_1 \cdot I_{E1} = E_1 \cdot (-I_I - I_{II}) = 348 \text{ W}$$

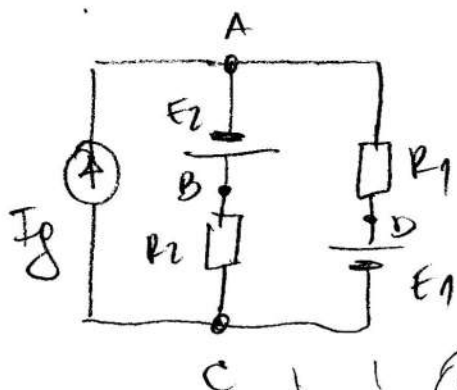
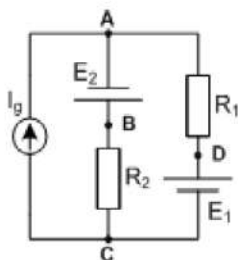
$$P_{I_3} = U_{I_3} \cdot I_3; U_{I_3} = U_{BD} = R_D I_3 - (R_A + R_1) I_{E1} + E_1 = -14 \text{ V} \Rightarrow P_{I_3} = -14 \text{ W}$$

$$P_{R3} = R_3 I_{R3}^2 \quad (?) \quad I_{R3} = \frac{U_{R3}}{R_3} = \frac{U_{AD}}{R_3}$$

$$P_{R3} = \frac{U_{AD}^2}{R_3}, \quad U_{AD} = R_D I_3 - R_A I_{E1} = \frac{10}{3} \cdot 1 - \frac{10}{3} \cdot 5,8 = -16 \text{ V}$$

$$P_{R3} = \frac{16^2}{10} = 25,6 \text{ W}$$

U kolu na slici, primenom metode napona između čvorova, odrediti intenzitete struja u svim granama i napon U_{BD} . Poznato je: $E_1 = 6V$, $E_2 = 2V$, $R_1 = 10\Omega$ i $R_2 = 20\Omega$, $I_g = 2A$.



MHY - uz I_{K3}

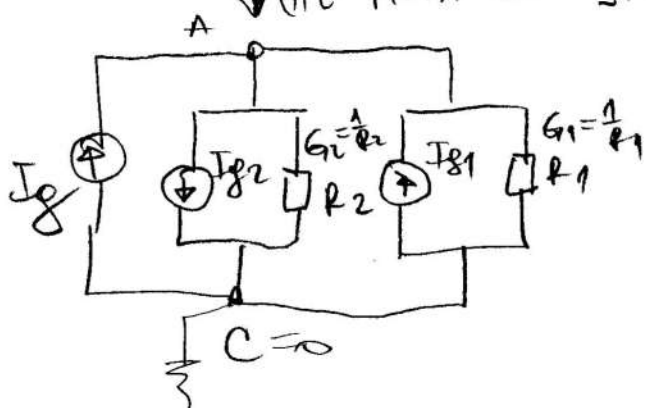
$$N_c - 1 = 1 \Rightarrow 1 \times 1$$

U350P PEF. 480PA!

AKO $C=0 \Rightarrow U_{AO}$ HENOSHAATA!

$$\textcircled{A} \quad G_{AA} U_{AO} = \sum I_g \quad (1)$$

(HE MORA CE YPTATI HOBO KOXO)



$$I_{g1} = \frac{E_1}{R_1}, \quad I_{g2} = \frac{E_2}{R_2}$$

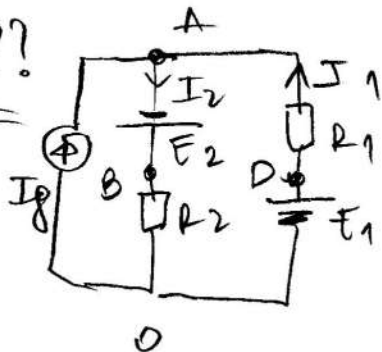
$$G_{AA} = \frac{1}{R_2} + \frac{1}{R_1}$$

$$\sum I_g = I_g - I_{g2} + I_{g1} = I_g - \frac{E_2}{R_2} + \frac{E_1}{R_1}$$

$$\textcircled{A} \quad \left(\frac{1}{R_2} + \frac{1}{R_1} \right) U_{AO} = I_g + \frac{E_1}{R_1} - \frac{E_2}{R_2}$$

$$U_{AO} = \frac{R_1 R_2 I_g + R_2 E_1 - R_1 E_2}{R_1 + R_2} = \frac{400 + 120 - 20}{30} = \frac{50}{3} V$$

$I_1, I_2 ??$



$$U_{AO} = E_1 - R_1 I_1 = R_2 I_2 - E_2$$

$$I_1 = \frac{E_1 - U_{AO}}{R_1} = \dots = -\frac{16}{15} A$$

$$I_2 = \frac{E_2 + U_{AO}}{R_2} = \dots = \frac{14}{15} A$$

$$U_{BD} = \dots$$

(4)