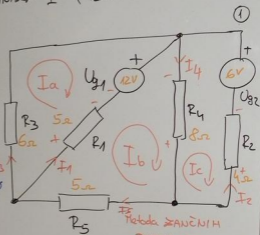


3. KOLOKVIJ OSNOV ELEKTROTEHNIKE I (12.01.2012)

$$I_a) \frac{I_a(R_1+R_3) - I_b R_3 + U_{g1}}{I_a(R_1+R_3) - I_b R_3} = -U_{g1}$$

$$I_b) \frac{I_b(R_1+R_3+R_4) - I_a R_1 - I_c R_4 - U_{g1}}{I_b(R_1+R_3+R_4) - I_a R_1 - I_c R_4} = U_{g1}$$

$$I_c) \frac{I_c(R_2+R_4) - I_b R_4 + U_{g2}}{I_c(R_2+R_4) - I_b R_4} = -U_{g2}$$



$$I_1 = I_b - I_a$$

$$I_2 = I_c$$

$$I_3 = I_a$$

$$I_4 = I_b - I_c$$

$$I_5 = I_b$$

$$I_4 = I_b - I_c = 0,582 \text{ A}$$

$$I_1 = I_b - I_a = 1,224 \text{ A}$$

Metoda ZANČNIH
TOČKI Z
matriko

	a)	b)	c)	u)
a)	R_3+R_1 11	$-R_1$ -5	\emptyset	$-U_{g1}$ -12
b)	$-R_1$ -5	$R_1+R_3+R_4$ 18	$-R_4$ -8	U_{g1} 12
c)	\emptyset	$-R_4$ -8	R_2+R_4 12	$-U_{g2}$ -6

$$\Rightarrow I_a = -0,979 \text{ A}$$

$$\Rightarrow I_b = 0,45 \text{ A}$$

$$\Rightarrow I_c = -0,155 \text{ A}$$

"I2



3. KOLOKVIJ OŠNOV ELEKTROTEHNIKE I (12.01.2012)

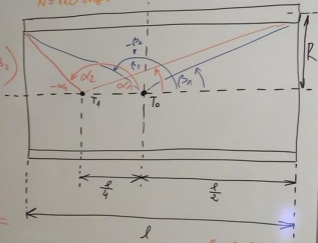
$R = 30\text{cm} = 0,03\text{m}$ $H_1 = 6000\text{ A/m}$
 $l = 12\text{cm} = 0,12\text{m}$ $I = ?$ $H_{T_0} = ?$
 $N = 120$ vijaka

(2)

$$H_B = \frac{I \cdot N}{4 \cdot \frac{l}{2}} (\cos \beta_1 - \cos \beta_2)$$

$$H_{T_0} = \frac{23 \cdot 120}{4 \cdot 0,06} \left(\frac{l}{\sqrt{(\frac{l}{2})^2 + R^2}} \right)$$

$$H_{T_0} = 6484,597 \frac{\text{A}}{\text{m}}$$



$$H = \frac{IN}{4a} (\cos \alpha_1 - \cos \alpha_2)$$

$$\frac{l}{4} + \frac{l}{2} = \frac{3l}{4} = 0,09\text{m}$$

$$4aH = IN(\cos \alpha_1 - \cos \alpha_2)$$

$$I = \frac{4aH}{N(\cos \alpha_1 - \cos \alpha_2)}$$

$$I = \frac{4 \cdot \frac{0,12}{2} \cdot 6000}{120 \left(\frac{2^2}{\sqrt{(\frac{3l}{4})^2 + R^2}} \right)}$$



1,25 A



3. KOLOKVIJ OSNOV ELEKTROTEHNIKE I (12.01.2012)

(3)

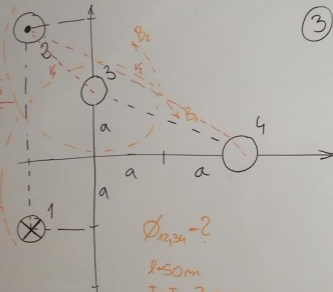
$$\Phi_{2,34} = \frac{\mu_0 \cdot I \cdot l}{2\pi} \ln \frac{r_2}{r_1}$$

$$\Phi_{2,34} = \frac{4\pi \cdot 10^{-7} \cdot 30 \cdot 50}{2\pi} \ln \frac{\sqrt{13}}{\sqrt{2}}$$

$$\Phi_{2,34} = 2,807 \cdot 10^{-4} \text{ V/D}$$

$$\Phi_{1,34} = \frac{4\pi \cdot 10^{-7} \cdot 30 \cdot 50}{2\pi} \ln \frac{\sqrt{10}}{\sqrt{5}}$$

$$\Phi_{1,34} = 6,5 \cdot 10^{-4} \text{ V/D}$$



$$\Phi_{12,34} = ?$$

$$l = 50 \text{ m}$$

$$I_1 = I_2 = 30 \text{ A}$$

$$a = 20 \text{ cm} = 0,2 \text{ m}$$

$$\Phi_{12,34} = \Phi_{1,34} - \Phi_{2,34}$$

$$\Phi_{12,34} = -3,693 \cdot 10^{-4} \text{ V/D}$$



3. KOLOKVIJ OSNOV ELEKTROTEHNIKE I (12.01.2012)

(4)

$$F_{13} = \frac{I_1 \cdot I_2 \cdot \mu_0 \cdot l}{2\pi r_{13}}$$

$$F_{13} = \frac{100 \cdot 50 \cdot 4\pi \cdot 10^{-7} \cdot 100}{2\pi \cdot 0,2 \cdot 100} \left(\vec{i}_x \frac{1}{100} + \vec{i}_y \frac{3}{100} \right)$$

$$F_{13} = \left(\vec{i}_x 5 \cdot 10^{-2} + \vec{i}_y 15 \cdot 10^{-2} \right) \text{N}$$

$$F_{23} = \left(-\vec{i}_x 5 \cdot 10^{-2} + \vec{i}_y 15 \cdot 10^{-2} \right) \text{N}$$

$$\vec{F}_0 = B_0 \cdot I_3 = -\vec{i}_y 1 \cdot 10^{-2} \text{N}$$

... x1x2x3y2...

$$\vec{F}_1 = I \left(\vec{i}_1 \times \vec{B} \right)$$

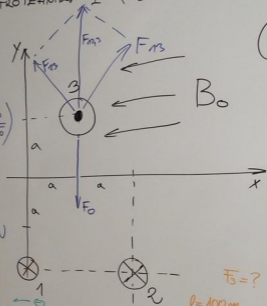
$$\vec{i}_2 \times (-\vec{i}_x) = \vec{i}_y$$

$$F_3 = F_1 + F_2 - F_0$$

$$\vec{F}_2 = \vec{F}_3$$

$$F_0 = -\vec{i}_2 \times (-\vec{i}_x) = -\vec{i}_y$$

$$F_3 = \vec{i}_y 29 \cdot 10^{-2}$$



$F_3 = ?$

$l = 100 \text{ m}$

$B_0 = 2 \cdot 10^{-4} \text{ T}$

$I_1 = I_2 = 100 \text{ A}$

$I_3 = 50 \text{ A}$

$r_{13} = r_{23} = 0,2 \text{ m}$



3. KOLOKVIJ OSNOV ELEKTROTEHNIKE I (12.01.2012)

5

$$U_i = -N \frac{\Delta \Phi}{\Delta t}$$

$$U_{i1} = -80 \frac{-5 \cdot 10^{-4}}{1 \cdot 10^{-3}} = 40V$$

$$U_{i2} = -80 \frac{-5 \cdot 10^{-4}}{2 \cdot 10^{-3}} = 20V$$

$$U_{i3} = -80 \frac{15 \cdot 10^{-4}}{2 \cdot 10^{-3}} = -60V$$

$$U_{i4} = -80 \frac{-10 \cdot 10^{-4}}{1 \cdot 10^{-3}} = 80V$$

$$U_i = \sum_{i=1}^4 U_{ii}$$

$$U_i = \underline{\underline{80V}}$$

