

$$5-1) R_1 = ?$$

$$U_{122} = -2,9V$$

$$U_{uL} = 2V$$

$$R_2 = 68k\Omega$$

$$R_3 = 20k\Omega$$

$$R_4 = 47k\Omega$$

Pogledamo struje na pojedinim elementima

$$i_1 = \frac{U_{uL} - U_{-1}}{R_1}$$

$$i_2 = \frac{U_{-1} - U_{+2}}{R_2}$$

$$i_3 = \frac{\phi - U_{-2}}{R_3}$$

$$i_4 = \frac{U_{-2} - U_{122}}{R_4}$$

zatim napone na OP-pojacalima

$$U_{122} = U_{-3} = U_{+3} = U_{+2} = U_{-2}$$

$$U_{+1} = U_{-1} = \phi$$

i na kraju opet struje

$$i_1 = i_2$$

$$i_3 = i_4$$

$$\frac{U_{uL} - U_{-1}}{R_1} = \frac{U_{-1} - U_{+2}}{R_2}$$

$$\frac{-U_{-2}}{R_3} = \frac{U_{-2} - U_{122}}{R_4}$$

sada malo izmjenimo napone i dobijemo

$$\frac{U_{uL}}{R_1} = \frac{-U_{122}}{R_2} \Rightarrow R_1 = U_{uL} \cdot \frac{-U_{122}}{R_2}$$

$$= 2V \cdot \frac{-(-2,9V)}{68k\Omega}$$

$$R_1 = U_{uL} \cdot \frac{R_2}{-U_{122}}$$

$$= 2V \cdot \frac{68k\Omega}{-(-2,9V)}$$

$$= 46,89655172 k\Omega$$

* ZAKLJUČAK :

nije komplicirano, ali paziti kod množenja *blush*

ponudeno rj. moramo zaokružiti na

$47k\Omega$ što imamo u ponuđenim odgovorima

$$5-2 \mid R_4 = 2$$

$$U_{121} = -8,28V$$

$$U_{u2} = 1,5V$$

$$R_1 = 27 k\Omega$$

$$R_2 = 68 k\Omega$$

$$R_3 = 47 k\Omega$$

NEĆEMO ISPOČETKA SVE POSTAVLJATI
POGLEDATI SCAN RANIJE.

$$\frac{-U_{-2}}{R_3} = \frac{U_{-2} - U_{121}}{R_4}$$

$$R_4 = \frac{U_{-2} - U_{121}}{-U_{-2}} \cdot R_3$$

NE ZNAMO U_{-2} ; ali to nije
problem. ZNAMO DA JE

~~$R_2 = R_4$~~ / ~~R_4~~ je jednak

$$U_{-2} = U_{12} = U_{13} = U_{-3} = U_{122}$$

koji ćemo izračunati

$$\frac{U_{u2} - U_{-1}}{R_1} = \frac{U_{-1} - U_{12}}{R_2} \quad \text{TRAŽIMO}$$

$$R_2 U_{u2} - R_2 U_{-1} = R_1 U_{-1} - R_1 U_{12}$$

$$U_{12} = \frac{R_2 U_{u2}}{-R_1}$$

sada znamo i $U_{-2} \therefore$

$$U_{12} = \frac{68 k\Omega \cdot 1,5V}{-27 k\Omega}$$

$$= -3,78 V$$

$$R_4 = \frac{-3,78V + 8,28V}{-(-3,78V)} \cdot 47 k\Omega$$

$$= 56,01294118 k\Omega$$

* ZAKLJUČAK: opet ništa komplicirano,
moramo opet zaokruživati rj.

na $56 k\Omega$, a ta vrijednost
se nalazi u ponuđenim
odgovorima.

$$5-3) U_{uc} = ?$$

$$U_{i2} = 10V$$

$$R_1 = 33 k\Omega$$

$$R_2 = 68 k\Omega$$

$$R_3 = 33 k\Omega$$

$$R_4 = 56 k\Omega$$

opet gledamo prvi scan

$$\frac{U_{uc}}{R_1} = \frac{-U_{i2}}{R_2} \quad \text{TRAŽIMO}$$

$$\frac{-U_{i2}}{R_3} = \frac{U_{i2} - U_{i21}}{R_4}$$

KAO ŠTO SE VIDI IZ PRILOŽENOG
IMAMO SVE :-)

$$U_{uc} = \frac{R_1}{R_2} \cdot (-U_{i2}) = \frac{33 k\Omega}{68 k\Omega} \cdot 3,7 V = 1,799405155 V$$

$$-R_4 U_{i2} = R_3 U_{i2} - R_3 U_{i21}$$

$$R_3 U_{i21} = R_3 U_{i2} + R_4 U_{i2}$$

$$= U_{i2} (R_3 + R_4)$$

$$U_{i21} = \frac{R_3}{R_3 + R_4} \cdot U_{i2} = \frac{33 k\Omega}{33 k\Omega + 56 k\Omega} \cdot 10V = 3,707865169 V$$

* ZAKLJUČAK : OPET
ZAKRUGUJEMO NA

$1,8 V$ koje je
ponuđeno kao rj.

$$5-4) \mu_{121}, \mu_{122} = ?$$

$$\mu_{uL} = -2,1V$$

$$R_1 = 27 k\Omega$$

$$R_2 = 56 k\Omega$$

$$R_3 = 39 k\Omega$$

$$R_4 = 82 k\Omega$$

Opet se pozivam na prvi scan, da ne postavljam sve ispočetka.

$$\frac{\mu_{uL}}{R_1} = \frac{-\mu_{122}}{R_2} \Rightarrow \boxed{\mu_{122}} = -\frac{R_2}{R_1} \cdot \mu_{uL} = \boxed{4,356 V} \checkmark$$

$$\frac{-\mu_{122}}{R_3} = \frac{\mu_{122} - \mu_{121}}{R_4} \quad \text{još samo ovo}$$

* ZAKLJUČAK: opet moramo zakruživati

$$\boxed{\mu_{122} = 4,356 V} \quad i$$

$$\boxed{\mu_{121} = 13,51V}$$

vidi čuda to je ponuđeno među rješenjima

$$-R_4 \mu_{122} = R_3 \mu_{122} - R_3 \mu_{121}$$

$$R_3 \mu_{121} = R_3 \mu_{122} + R_4 \mu_{122}$$

$$= \mu_{122} (R_3 + R_4)$$

$$\boxed{\mu_{121}} = \frac{(R_3 + R_4)}{R_3} \cdot \mu_{122} = \boxed{13,5139031 V}$$

$$5-1) R_1 = ?$$

$$U_{i22} = -4,51 \text{ V}$$

$$U_{u2} = 2 \text{ V}$$

$$R_2 = 68 \text{ k}\Omega$$

$$R_3 = 20 \text{ k}\Omega$$

postavimo struje kroz elemente

$$i_1 = \frac{U_{u2} - U_{-1}}{R_1}$$

$$i_2 = \frac{U_{-1} - U_{-2}}{R_2}$$

$$i_3 = \frac{U_{-2} - U_{i22}}{R_3}$$

zatim napone

$$U_{+1} = U_{-1} = \phi$$

$$U_{-2} = U_{+2} = U_{i22}$$

i opet prelazimo na struje

$$i_1 = i_2$$

$$i_2 = i_3$$

$$\frac{U_{u2} - U_{-1}^{\phi}}{R_1^?} = \frac{U_{-1}^{\phi} - U_{-2}}{R_2^{\checkmark}}$$

$$\frac{U_{-1}^{\phi} - U_{-2}}{R_2^{\checkmark}} = \frac{U_{-2} - U_{i22}^{\checkmark}}{R_3^{\checkmark}}$$

$$\frac{U_{u2}}{R_1} = \frac{-U_{-2}}{R_2}$$

$$\frac{-U_{-2}}{R_2} = \frac{U_{-2} - U_{i22}}{R_3}$$

$$R_1 = - \frac{U_{u2}}{U_{-2}} \cdot R_2^{\checkmark}$$

$$-R_3 U_{-2} = R_2 U_{-2} - R_2 U_{i22}$$

$$R_2 U_{i22} = R_2 U_{-2} + R_3 U_{-2}$$

$$= U_{-2} (R_2 + R_3)$$

$$U_{-2} = \frac{R_2}{R_2 + R_3} \cdot U_{i22}$$

sada imamo sve za dobiti rješenje :-)

$$\boxed{U_{-2}} = \frac{68 \text{ k}\Omega}{68 \text{ k}\Omega + 20 \text{ k}\Omega} \cdot (-4,51 \text{ V})$$

$$\boxed{= -3,485 \text{ V}}$$

$$\boxed{R_1} = - \frac{2 \text{ V}}{-3,485 \text{ V}} \cdot 68 \text{ k}\Omega$$

$$= 39,02439024 \text{ k}\Omega$$

$$\boxed{\approx 39 \text{ k}\Omega}$$

$$5-2) R_2 = ?$$

$$U_{iz1} = -1V$$

$$U_{ul} = 1,5V$$

$$R_1 = 27 k\Omega$$

$$R_3 = 68 k\Omega$$

gledamo što smo postavili
u prvom SCAN-u!

$$\frac{U_{ul} \checkmark}{R_1 \checkmark} = \frac{-U_{iz1} \checkmark}{R_2 \text{?}}$$

$$\frac{-U_{iz1} \checkmark}{R_2 \text{?}} = \frac{U_{iz2} \checkmark}{R_3 \checkmark}$$

ermmm... OK, ovo je mala

blesavo. NEKA NETKO

POTVRDI R_1 ?

$$R_2 = - \frac{U_{iz1}}{U_{ul}} \cdot R_1$$

$$= - \frac{-1V}{1,5} \cdot 27$$

$$= 18 k\Omega$$

* još mi uvijek nije jasno

zašto Mirko Fodor voli čevape?

-kakve to veze ima sa vremenom, i

zašto uvijek pada kiša odozgo
prema dolje?

$$5-3.) U_{uL} = ?$$

$$U_{i22} = 7,74 \text{ V}$$

$$R_1 = 27 \text{ k}\Omega$$

$$R_2 = 56 \text{ k}\Omega$$

$$R_3 = 39 \text{ k}\Omega$$

pozivam se na 1.

SCAN.

$$\begin{aligned} \frac{U_{uL}}{R_1} &= \frac{-U_{i2}}{R_2} \\ \frac{-U_{i2}}{R_2} &= \frac{U_{i2} - U_{i22}}{R_3} \end{aligned}$$

tražimo TREBAMO

TU JE $\frac{U_{i2}}{R_2}$

$$U_{uL} = -\frac{R_1}{R_2} \cdot U_{i2} \Rightarrow \boxed{U_{uL}} = -\frac{27 \text{ k}\Omega}{56 \text{ k}\Omega} \cdot 4,65 \text{ V}$$

$$-R_3 U_{i2} = R_2 U_{i2} - R_3 U_{i22}$$

$$\boxed{= -2,199789475 \text{ V}} \approx \underline{\underline{-2,2 \text{ V}}}$$

* zaokružujemo i imamo ponuđeno
rješenje

$$R_2 U_{i22} = R_2 U_{i2} + R_3 U_{i2}$$

$$= U_{i2} (R_2 + R_3)$$

$$\boxed{U_{i2}} = \frac{R_2}{R_2 + R_3} \cdot U_{i22}$$

$$= \frac{56 \text{ k}\Omega}{56 \text{ k}\Omega + 39 \text{ k}\Omega} \cdot 7,74 \text{ V}$$

$$\boxed{= 4,562526316 \text{ V}}$$

$$5-4.) \quad M_{i21}, M_{i22} = ?$$

$$M_{u1} = -2,1V$$

$$R_1 = 27 \text{ k}\Omega$$

$$R_2 = 56 \text{ k}\Omega$$

$$R_3 = 39 \text{ k}\Omega$$

POZIVAMO SE NA POSTAVU
ZADATAKA IZ 1. scena

$$\frac{M_{u1}}{R_1} = \frac{-M_{i21}}{R_2}$$

$$\frac{-M_{i21}}{R_2} = \frac{M_{i21} - M_{i22}}{R_3}$$

plan je iz prve dobiti

M_{i21} , uvrstiti u drugu

i dobiti M_{i22} .

$$\boxed{M_{i21}} = -\frac{R_2}{R_1} \cdot M_{u1} = -\frac{56 \text{ k}\Omega}{27 \text{ k}\Omega} \cdot (-2,1V) = \boxed{4,356 \text{ V}}$$

* opet zaokružujemo tj. i dobijemo

$$-R_3 M_{i21} = R_2 M_{i22} - R_2 M_{i22}$$

$$M_{i21} = 4,36 \text{ V}$$

$$M_{i22} = 7,39 \text{ V}$$

$$R_2 M_{i22} = R_2 M_{i21} + R_3 M_{i21}$$

$$= M_{i21} (R_2 + R_3)$$

$$\boxed{M_{i22}} = \frac{R_2 + R_3}{R_2} \cdot M_{i21} = \frac{(56 + 39) \text{ k}\Omega}{56 \text{ k}\Omega} \cdot 4,356 \text{ V} = \boxed{7,389 \text{ V}}$$

$$5-1.) A_v = \frac{U_{uL}}{U_{i2}} = ?$$

$$R_1 = 6,8 k\Omega$$

$$R_2 = 68 k\Omega$$

$$R_3 = 68 k\Omega$$

$$R_4 = 6,8 k\Omega$$

postavimo struje na elementima.

$$i_1 = \frac{U_{uL} - U_-}{R_1}$$

$$i_2 = \frac{U_- - U}{R_2}$$

$$i_3 = \frac{U_{i2} - U}{R_3}$$

$$i_4 = \frac{U - \phi}{R_4}$$

prelazimo na napone

$$U_+ = U_- = \phi$$

i opet na struje :-)

$$i_1 = i_2$$

$$i_4 = i_2 + i_3$$

DOBIJEMO KRIVO R_j jer je na početku A_v krivo postavljen!

$$A_v = \frac{U_{i2}}{U_{uL}} = -120$$

je točno R_j :-)

za $i_1 = i_2$ vrijedi

$$\frac{U_{uL} - U_-}{R_1} = \frac{U_- - U}{R_2}$$

$$\frac{U_{uL}}{R_1} = \frac{-U}{R_2} \Rightarrow U_{uL} = -\frac{R_1}{R_2} U$$

TRAŽIMO :-)

za $i_2 + i_3 = i_4$ vrijedi

$$\frac{U_- - U}{R_2} + \frac{U_{i2} - U}{R_3} = \frac{U}{R_4}$$

$$\frac{-U}{R_2} + \frac{U_{i2}}{R_3} - \frac{U}{R_3} = \frac{U}{R_4}$$

$$\frac{U_{i2}}{R_3} = \frac{U}{R_4} + \frac{U}{R_2} + \frac{U}{R_3}$$

$$\frac{U_{i2}}{R_3} = \frac{U R_2 R_3 + U R_4 R_3 + U R_2 R_4}{R_2 R_3 R_4}$$

$$U_{i2} = \frac{U (R_2 R_3 + R_3 R_4 + R_2 R_4)}{R_2 R_4}$$

$$U = \frac{R_2 R_4}{R_2 R_3 + R_3 R_4 + R_2 R_4} \cdot U_{i2}$$

$$= -\frac{R_1}{R_2} \left(\frac{R_2 R_4}{R_2 R_3 + R_3 R_4 + R_2 R_4} \cdot U_{i2} \right)$$

$$= -\frac{R_1 R_4}{R_2 R_3 + R_3 R_4 + R_2 R_4} = -0,0083$$

tu sam se malo zagubio :-p

ovo je -120 ako R_j stavimo u nazivnik

$$5-2.) R_{uL} = ?$$

$$R_1 = 6,8 \text{ k}\Omega$$

$$R_2 = 68 \text{ k}\Omega$$

$$R_3 = 68 \text{ k}\Omega$$

$$R_4 = 6,8 \text{ k}\Omega$$

pozivamo se na prijašnji
scan...

$$I = \frac{U}{R} \Rightarrow R_{uL} = \frac{U_{uL}}{I_{uL}}$$

$$I_{uL} = i_1 = \frac{U_{uL} - U_{\phi}}{R_1}$$

OK ... možda se i ne
pozivamo na prijašnji
SCAN :D

$$R_{uL} = \frac{\frac{U_{uL}}{\frac{U_{uL}}{R_1}}} = R_1 = 6,8 \text{ k}\Omega$$

$$5-3?) \quad U_{uc} = ?$$

$$U_{i2} = -12V$$

$$R_1 = 68 k\Omega$$

$$R_2 = 68 k\Omega$$

$$R_3 = 68 k\Omega$$

$$R_4 = 6,8 k\Omega$$

OVAJ PUT SE DEFINITIVNO
POZIVAMO NA 1. SCAN

$$U_{uc} = - \frac{R_1}{R_2} \cdot U$$

$$U = \frac{R_2 R_4}{R_2 R_3 + R_3 \cdot R_4 + R_2 R_4} \cdot U_{i2}$$

IZGLEDA PREČ... KRATKO DA BI

BILA ISTINITO :(

$$\boxed{U = -1V}$$

$$\boxed{U_{uc}} = - \frac{68 k\Omega}{68 k\Omega} \cdot (-1V)$$

$$\boxed{U = 1V}$$

* ček tko tu koga? :D

namam se da će nešto ovakvog

na ponovljenom XD XD XD

$$5-4.) \quad U_{i2} = ?$$

$$U_{u2} = -2V$$

$$R_1 = 68 \text{ k}\Omega$$

$$R_2 = 68 \text{ k}\Omega$$

$$R_3 = 68 \text{ k}\Omega$$

$$R_4 = 68 \text{ k}\Omega$$

pozivam se na 1.

SCAN

$$\boxed{U} = - \frac{R_2}{R_1} \cdot U_{u2}$$

$$\boxed{U} = +2V$$

$$\boxed{U_{i2}} = \frac{R_2 R_2 + R_3 \cdot R_4 + R_2 R_4}{R_2 R_4} \cdot U$$

$$= 3 \cdot 2 \quad \boxed{U = 6V}$$

* MISLIM ZBILJA ... zašto sam pao prvi put?