1. Auditorne vježbe

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ima na šalab.

Zad. 1.)

$R = 5{,}16\,k\Omega \qquad C = 0{,}1\,\mu F$

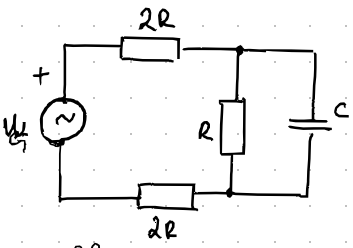
$t = 0 \rightarrow u_{C0} = 1{,}5V$

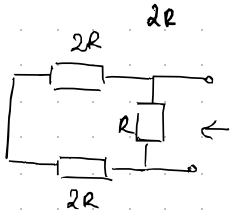
$$u_C(t) = u_{Cp} + (u_{Ck} - u_{Cp})\left[1 - \exp\left(-\frac{t - t_p}{\tau}\right)\right]$$

$$\tau = RC$$

a) u_{iz} na C u $t = 0,\ t = 1,\ t = 2,\ t = 4$ i $t = 6$ ms

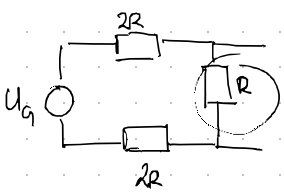
b) skica izlaznog napona



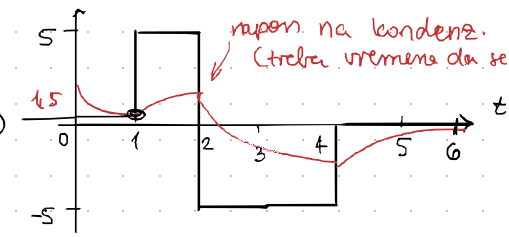


$$R_{TH} = \left(\frac{1}{4R} + \frac{1}{R}\right)^{-1}$$

$R_{TH} = 4480\,\Omega$



napon na R → $U_R = U_G \cdot \frac{1}{5} = \begin{cases} U_{TH\,visoki} = 1V \\ U_{TH\,niski} = -1V \end{cases}$



$$\tau = R_{TH} \cdot C = 4480\,\Omega \cdot 0{,}1\,\mu F = 0{,}448\,ms = \tau$$

$$u_{iz}(t=0) = u_C(t=0) = u_{C0} \Rightarrow \boxed{u_{iz}(t=0) = 1{,}5V}$$

$$u_{iz}(t=1) = u_C(t=1) = u_{C0} + (0V - u_{C0})\left[1 - \exp\left(-\frac{1ms - 0}{\tau}\right)\right]$$

$$\boxed{u_{iz}(t=1) = 0{,}161V} \rightarrow u_{iz,1}$$

$$u_{iz}(t=2) = u_C(t=2) = u_{iz,1} + (u_{TH} - u_{iz,1})\left[1 - \exp\left(-\frac{2ms - 1ms}{\tau}\right)\right]$$

$$\boxed{u_{iz}(t=2) = 0{,}910V} \rightarrow u_{iz2}$$

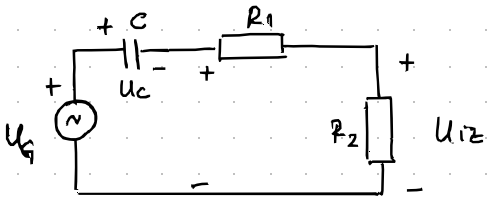
$$u_{iz}(t=4) = u_{iz_2} + (u_{TH} - u_{iz2})\left[1 - \exp\left(-\frac{4ms - 2ms}{\tau}\right)\right]$$

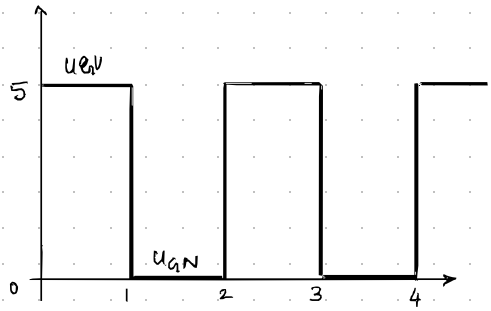
$$\boxed{u_{iz}(t=4) = 0{,}978V} \rightarrow u_{iz\,4}$$

$$u_{iz}(t=6) = u_{iz4} + (0V - u_{iz4})\left[1 - \exp\left(-\frac{6ms - 4ms}{\tau}\right)\right]$$

$$\boxed{u_{iz}(t=6) = -0{,}011V} \rightarrow u_{iz,6}$$

Zadatak 2)





$U_{GV} = 5V \quad U_{GN} = 0$

$R_{uk} = R_1 + R_c \Rightarrow R_{uk} = 5k\Omega$

$T = R_{uk} \cdot C \Rightarrow T = 1ms$

$U_R = U_g - U_c$

$U_{iz} = U_R \cdot \frac{R_2}{R_1 + R_2} \Rightarrow U_{iz} = \frac{3}{5} U_R$

$U_c(t=0_-) = 0V \quad U_c(t=0_+) = 0V$

$U_g(t=0_-) = 0V \quad U_c(t=0_+) = 5V$

$U_R(t=0_-) = 0V \quad U_R(t=0_+) = 5V$

$U_{iz}(t=0_-) = 0V \quad U_{iz}(t=0_+) = 3V$

$U_c(1_-) = U_c(0_+) + (U_{GV} - U_c(0_+))\left[1 - \exp\left(-\frac{1ms-0}{T}\right)\right] \rightarrow U_c(1_-) = 3.161V$

$U_g(1_-) = 5V$

$U_R(1_-) = 1.839V$

$U_{iz}(1_-) = 1,104V$

$U_c(1_+) = U_c(1_-) \Rightarrow U_c(1_+) = 3.161V$

$U_g(1_+) = 0V$

$U_R(1_+) = -3.161V$

$U_{iz}(1_+) = -1.296V$

$U_c(2_-) = U_c(1_+) + (U_{GN} - U_c(1_+))\left[1 - \exp\left(-\frac{2ms-1ms}{T}\right)\right] \Rightarrow U_c(2_-) = 1.163V$

$U_g(2_-) = 0V$

$U_R(2_-) = -1.168V$