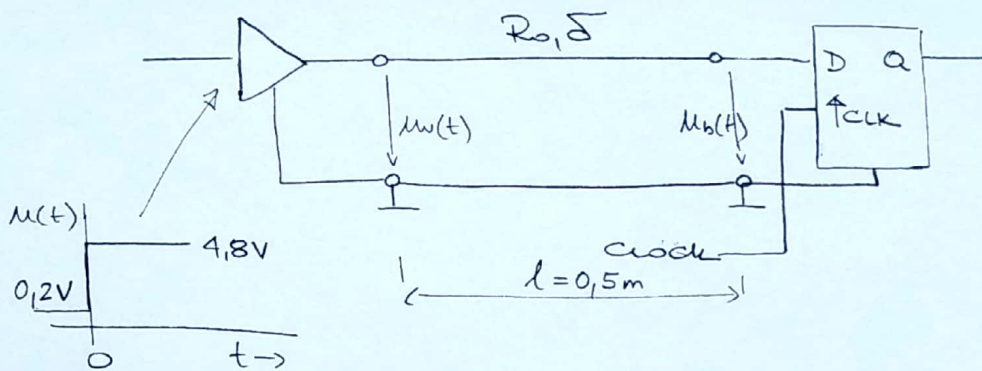


Ugotovite ali pri podanih podatkih vezje deluje pravilno. →



- $R_0 = 100 \Omega$
- $\delta = 6 \text{ ns/m}$
- $l = 0,5 \text{ m}$
- $R_{12H} = 10 \Omega$
- $R_{VH} = 10 \text{ k}\Omega$

$$\tau = \delta \cdot l = 6 \text{ ns/m} \cdot 0,5 \text{ m} = \underline{\underline{3 \text{ ns}}}$$

$$\rho_v = \frac{R_{12H} - R_0}{R_{12H} + R_0} = -0,82$$

$$\rho_b = \frac{R_{VH} - R_0}{R_{VH} + R_0} = 1$$

$$u_w(0^-) = u_b(0^-) = \frac{U_0 \cdot R_b}{R_v + R_b} = \frac{0,2 \text{ V} \cdot 10000}{10010} = 0,198 \text{ V} \approx \underline{\underline{0,2 \text{ V}}}$$

$$t=0^+ \quad u_w(0^+) = u_v(0^-) + \frac{\Delta U \cdot R_0}{R_v + R_0} = 0,2 \text{ V} + \frac{4,6 \text{ V} \cdot 100 \Omega}{110 \Omega} = 0,2 \text{ V} + 4,18 \text{ V} = \underline{\underline{4,38 \text{ V}}}$$

$$t=\tau \quad u_b(\tau) = u_b(0^-) + \mu_p(1) + \mu_p(1) \cdot \rho_b =$$

$$= 0,2 \text{ V} + 4,18 \text{ V} + 4,18 \text{ V} = \underline{\underline{8,56 \text{ V}}}$$

$\mu_r(1) = \mu_p(2) \leftarrow$

$$t=3\tau \quad u_b(3\tau) = \underline{\underline{1,72 \text{ V}}}$$

$$t=5\tau \quad u_b(5\tau) = \underline{\underline{7,32 \text{ V}}}$$

$$t=7\tau \quad u_b(7\tau) = \underline{\underline{2,72 \text{ V}}}$$

Če steem signalom kontinuirno D flip flop, ki je prosti z drugim signalom s frekvenco $f_1 = 166 \text{ MHz}$, pride lahko do nepravilne delovanja.

5a

POPOLNI
IZRAČUN

$$\begin{aligned}
 \underline{t=2\tau} \quad u_v(2\tau) &= u_v(0+) + \mu_p(2) + \overbrace{\mu_p(2)}^{\mu_r(2)} \cdot \rho_v = \\
 &= 4,38V + 4,18V + 4,18V \cdot (-0,82) = \\
 &= 4,38V + 4,18V - 3,42V = \underline{\underline{5,14V}}
 \end{aligned}$$

$$\mu_p(3) \rightarrow -3,42V = (\mu_r(2))$$

$$\begin{aligned}
 \underline{t=3\tau} \quad u_b(3\tau) &= u_b(2\tau) + \mu_p(3) + \overbrace{\mu_p(3)}^{\mu_r(3)} \rho_b = \\
 &= 8,56V - 3,42V - 3,42V = \underline{\underline{1,72V}}
 \end{aligned}$$

$$\mu_p(4) = -3,42V = \mu_r(3) \leftarrow$$

$$\begin{aligned}
 \underline{t=4\tau} \quad u_v(4\tau) &= u_v(2\tau) + \mu_p(4) + \mu_p(4) \cdot \rho_v = \\
 &= 5,14V - 3,42V - 3,42V \cdot (-0,82) = \\
 &= 5,14V - 3,42V + 2,8V = \underline{\underline{4,52V}}
 \end{aligned}$$

$$\mu_p(5) \cdot \mu_r(4) = 2,8V \rightarrow$$

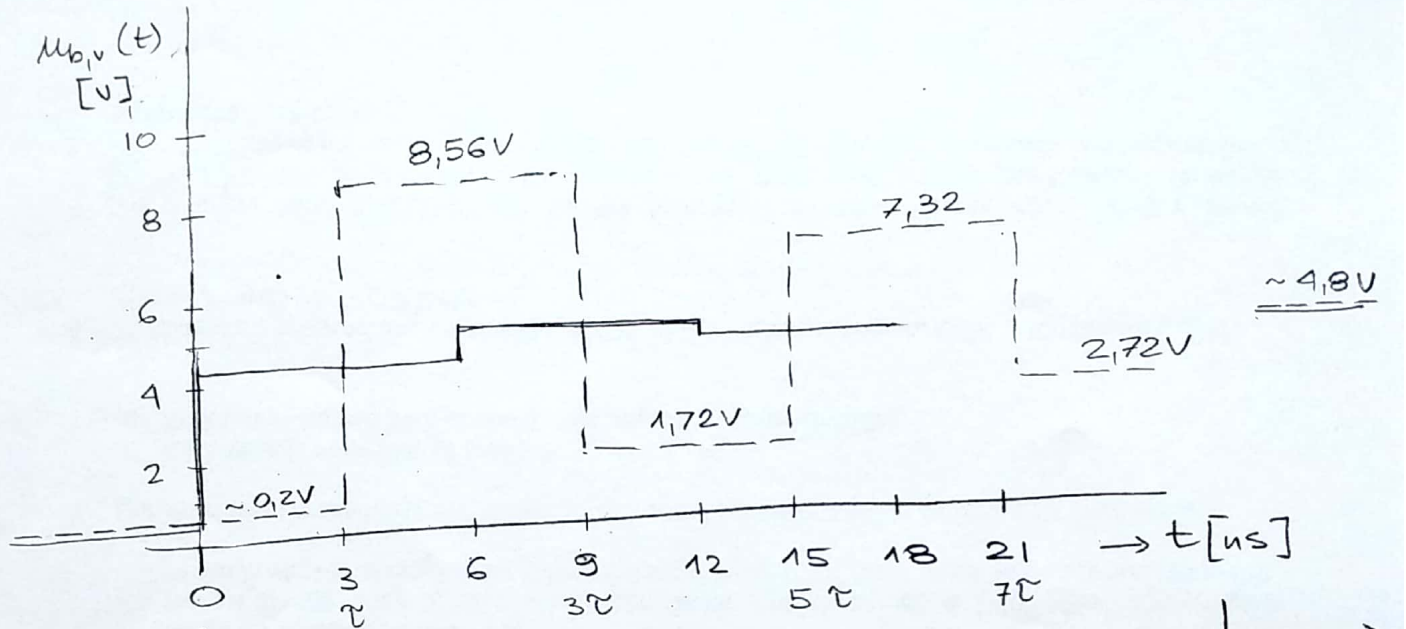
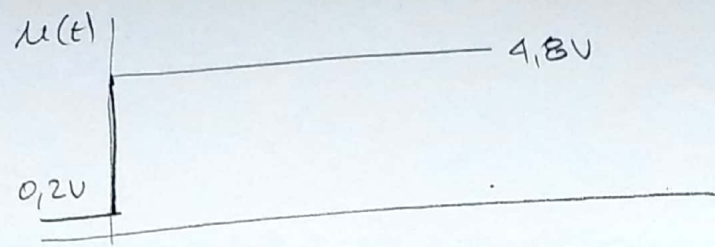
$$\begin{aligned}
 \underline{t=5\tau} \quad u_b(5\tau) &= u_b(3\tau) + \mu_p(5) + \mu_p(5) \cdot \rho_b = \\
 &= 1,72V + 2,8V + 2,8V = \underline{\underline{7,32V}}
 \end{aligned}$$

$$\mu_p(6) = 2,8V \leftarrow$$

$$\begin{aligned}
 \underline{t=6\tau} \quad u_v(6\tau) &= u_v(4\tau) + \mu_p(6) + \mu_p(6) \cdot \rho_v = \\
 &= 4,52V + 2,8V - 2,3V = \underline{\underline{5,02V}}
 \end{aligned}$$

$$\mu_p(7) = -2,3V \rightarrow$$

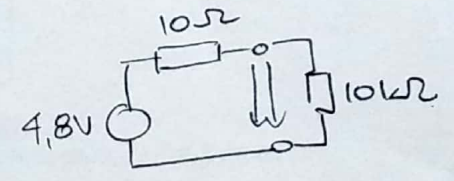
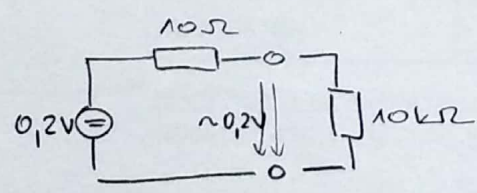
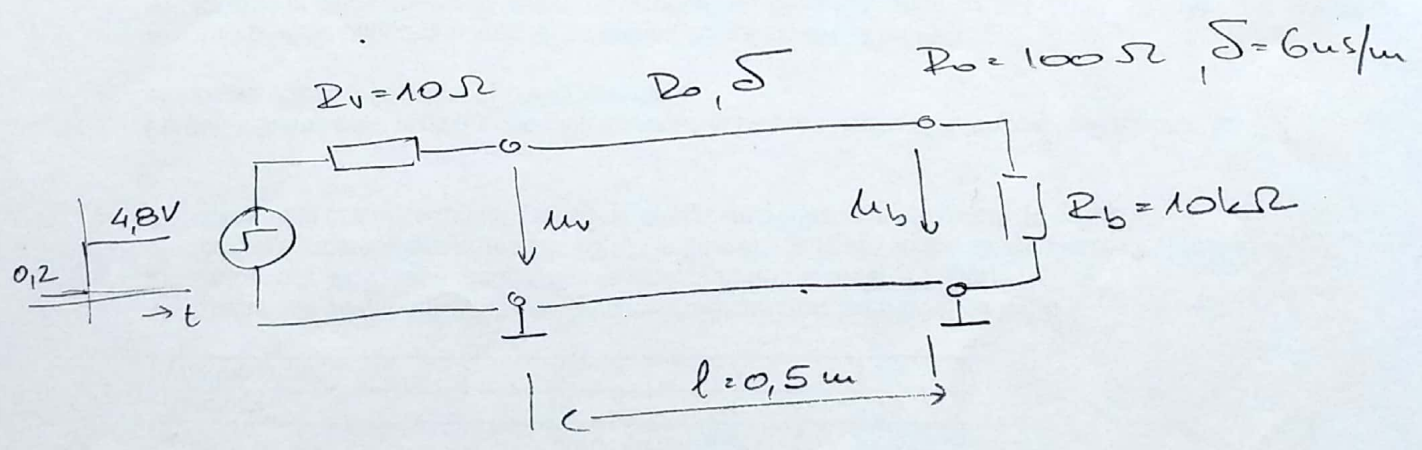
$$\begin{aligned}
 \underline{t=7\tau} \quad u_b(7\tau) &= u_b(5\tau) + \mu_p(7) + \mu_p(7) \cdot \rho_b = \\
 &= 7,32V - 2,3V - 2,3V = \underline{\underline{2,72V}}
 \end{aligned}$$



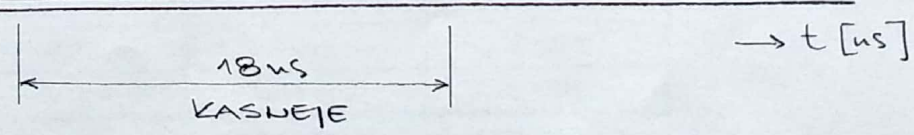
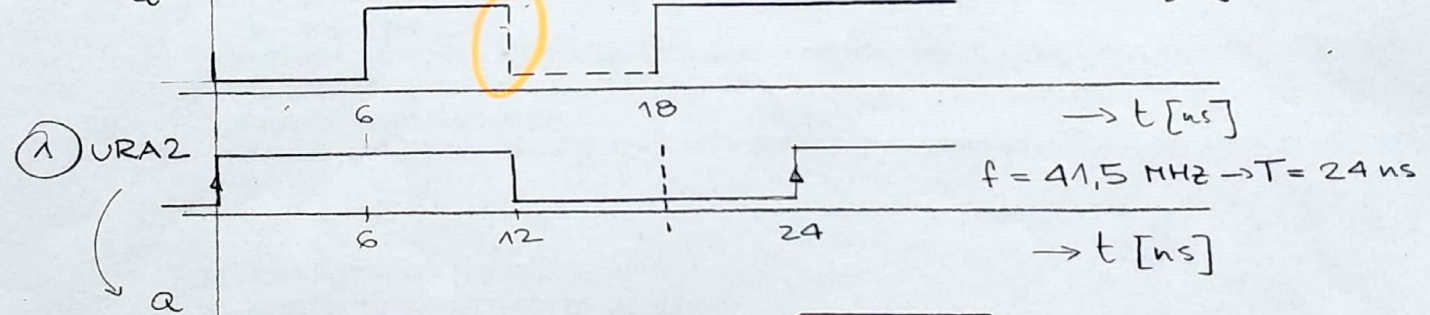
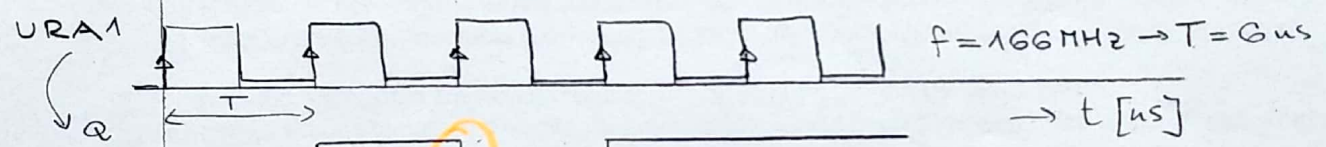
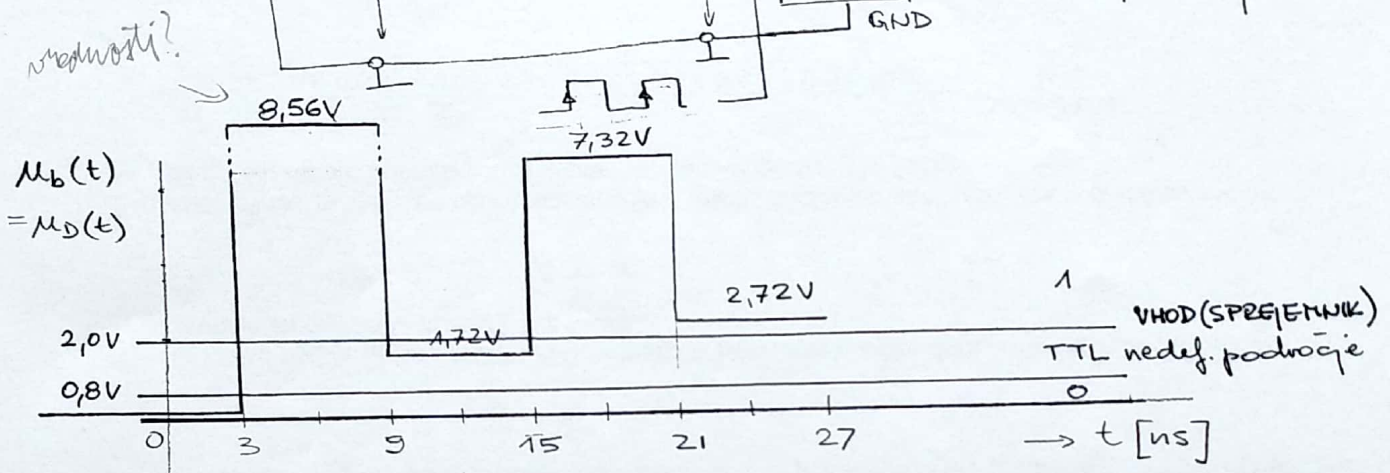
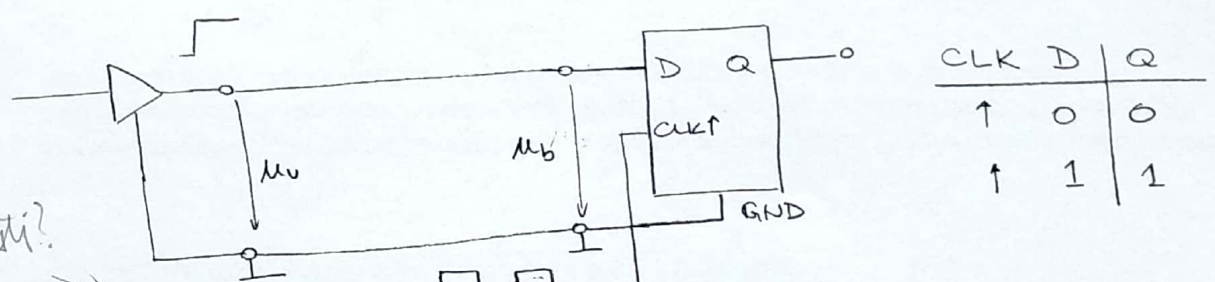
STAC. STANJE PRED 0 → 1
 $u_v = u_b = 0,2V$

~ do 10τ
 DOGAJANJE PO PREKLUPU
 (R) 20,5

STAC. STANJE
 $u_v = u_b = 4,8V$



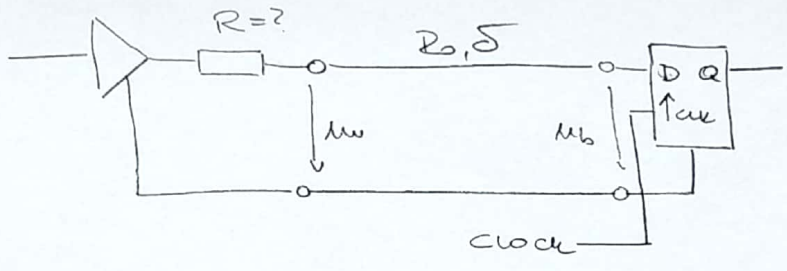
PROBLEM: Naš signal poži D flip-flop, li preklaplja na pozitivno frontu me.



$$T = 18 \text{ ns} \rightarrow f = \frac{1}{0,018} \cdot 10^6 \text{ Hz} = 55 \text{ MHz}$$

- Rešitev? ① Znižanje frekvence me = 55 MHz \Rightarrow nižja hitrost
- ② Prilagoditev me vhodu

2) Prilagoditev na vhod



$$R = R_0 - R_{iZH} = 100\Omega - 10\Omega = \underline{\underline{90\Omega}} \Rightarrow S_v = 0$$

$$S_v = 0$$

$$S_b = 1$$

$$U_w(0^-) = U_b(0^-) = \frac{U_0 \cdot 10000}{10100} = 0,198V = \underline{\underline{0,2V}}$$

$$U_w(0^+) = U_w(0^-) + \frac{\Delta U \cdot R_0}{R_v + R_0} = 0,2V + \frac{4,6V \cdot 100\Omega}{200\Omega} = 0,2V + \underline{\underline{2,3V}} = \underline{\underline{2,5V}}$$

$$U_b(\tau) = U_b(0^+) + \underset{M_v(1)}{2,3V} + 2,3V = \underline{\underline{4,8V}}$$

$$U_w(2\tau) = U_w(0^+) + 2,3V = \underline{\underline{4,8V}}$$

Na vnosu je $S_v = 0$ zato sta to končni vrednosti.

