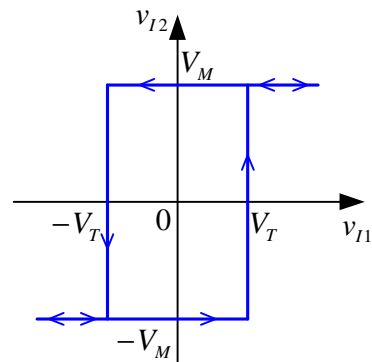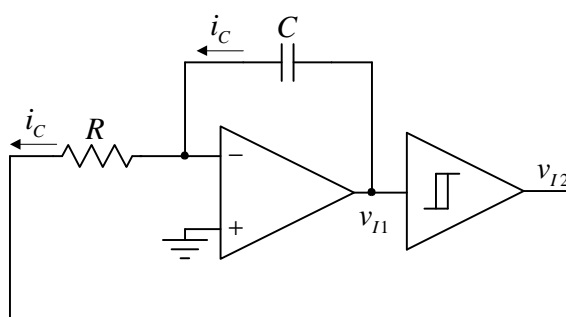# OSNOVI DIGITALNE ELEKTRONIKE (13S042ODE)

Generatori linearnih vremenskih baza

Generisanje linearnog napona pomoću strujnog izvora

➢   Videti 27. zadatak sa računskih vežbi; rešiti ga u opštim brojevima

Astabilni Milerov integrator

za $0 \le t \le \dfrac{T}{2}$:

$$v_{I2} = V_M$$

$$i_C(t) = -\frac{V_M}{R} = const$$

$$v_{I1} = \frac{1}{C}\int i_C(t)dt = -\frac{V_M}{C \cdot R} \cdot t + k_1 ; \qquad za \ t = \frac{T}{4} \ je \ v_{I1} = 0 \ \Rightarrow \ k_1 = \frac{V_M \cdot T}{4 \cdot C \cdot R}$$

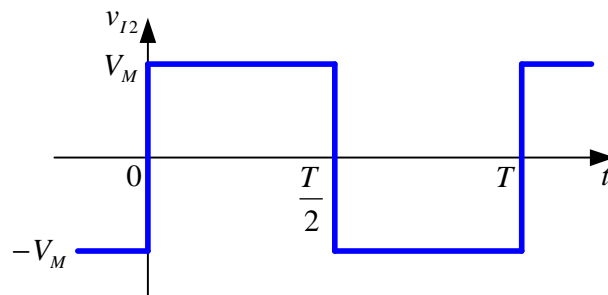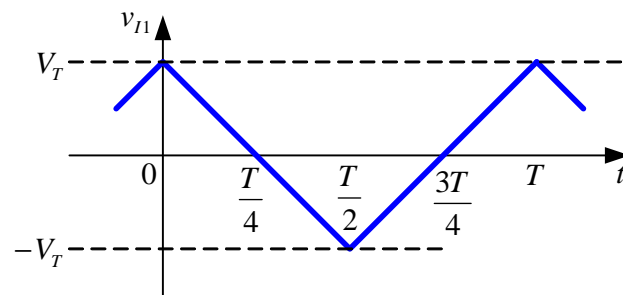$$v_{I1} = -\frac{V_M}{C \cdot R} \cdot \left(t - \frac{T}{4}\right)$$

za $\dfrac{T}{2} \le t \le T$:

$v_{I2} = -V_M$

$i_C(t) = \dfrac{V_M}{R} = const$

$v_{I1} = \dfrac{1}{C}\int i_C(t)dt = \dfrac{V_M}{C \cdot R} \cdot t + k_2$; $\qquad$ za $t = \dfrac{3T}{4}$ je $v_{I1} = 0$ $\;\Rightarrow\;$ $k_2 = -\dfrac{3 \cdot V_M \cdot T}{4 \cdot C \cdot R}$
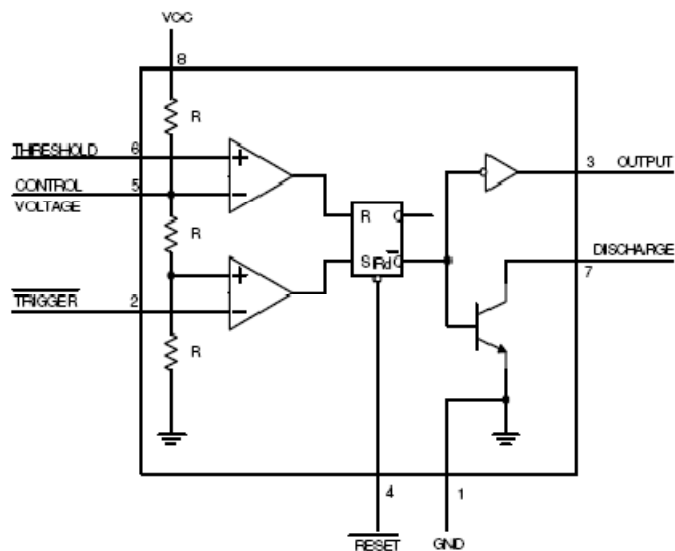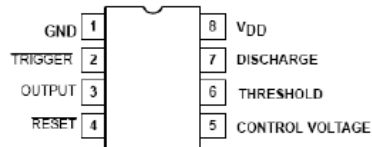
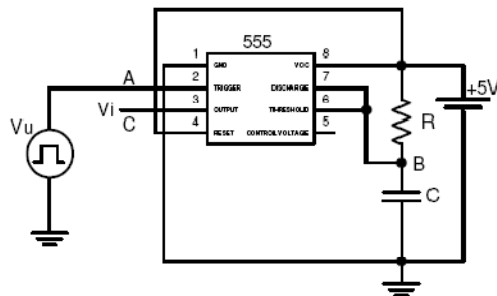$v_{I1} = \dfrac{V_M}{C \cdot R} \cdot \left(t - \dfrac{3T}{4} \right)$

za $t = \dfrac{T}{2}$ je $v_{I1} = -V_T$ $\;\Rightarrow\;$ $-V_T = -\dfrac{V_M}{C \cdot R} \cdot \left(\dfrac{T}{2} - \dfrac{T}{4} \right)$ $\;\Rightarrow\;$ $T = \dfrac{4 \cdot C \cdot R \cdot V_T}{V_M}$

Monostabilni multivibrator sa integrisanim tajmerom 555
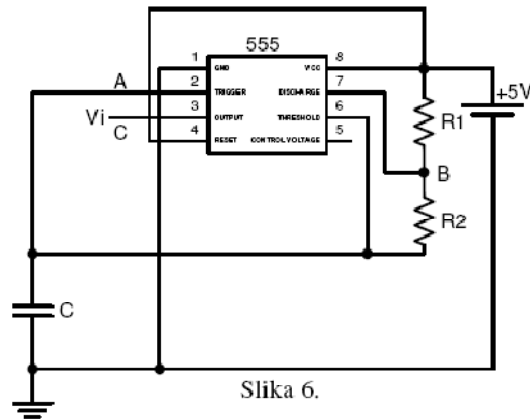
➢ Integrisani tajmer 555:

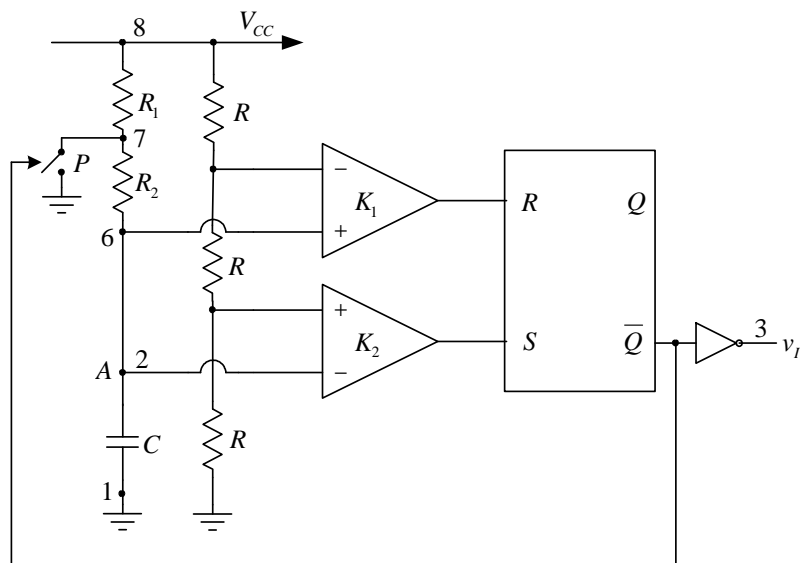➢ Monostabilni multivibrator sa integrisanim tajmerom 555:

➢ Videti 23. zadatak sa računskih vežbi; bipolarni tranzistor igra ulogu prekidača i može se ekvivalentirati prekidačem

Astabilni multivibrator sa integrisanim tajmerom 555

Slika 6.

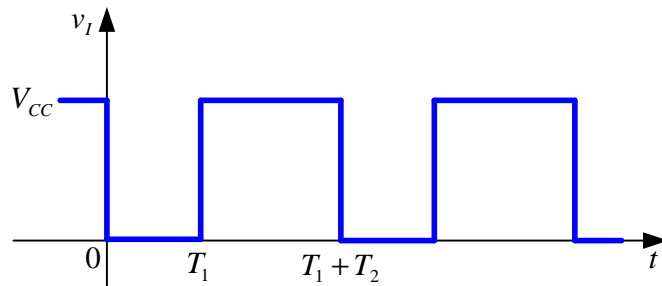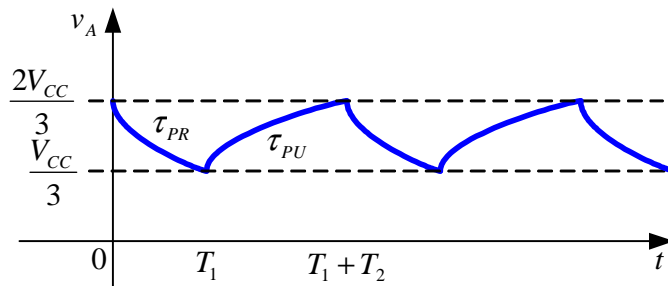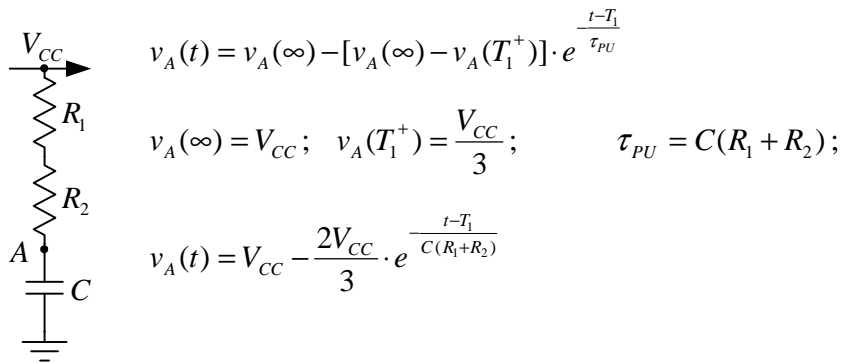➢ Bipolarni tranzistor igra ulogu prekidača i može se ekvivalentirati prekidačem

za $0 \leq t \leq T_1:$ $P \to ON$

$$v_A(t) = v_A(\infty) - [v_A(\infty) - v_A(0^+)] \cdot e^{-\frac{t}{\tau_{PR}}}$$

$$v_A(\infty) = 0; \qquad v_A(0^+) = \frac{2V_{CC}}{3}; \qquad \tau_{PR} = CR_2; \qquad v_A(t) = \frac{2V_{CC}}{3} \cdot e^{-\frac{t}{CR_2}}$$

za $T_1 \le t \le T_1 + T_2$: $\qquad$ $P \rightarrow OFF$

$$v_A(t) = v_A(\infty) - [v_A(\infty) - v_A(T_1^+)] \cdot e^{-\frac{t-T_1}{\tau_{PU}}}$$

$$v_A(\infty) = V_{CC}; \quad v_A(T_1^+) = \frac{V_{CC}}{3}; \qquad \tau_{PU} = C(R_1 + R_2);$$

$$v_A(t) = V_{CC} - \frac{2V_{CC}}{3} \cdot e^{-\frac{t-T_1}{C(R_1+R_2)}}$$

za $t = T_1$ je $v_A = \dfrac{V_{CC}}{3}$ $\Rightarrow$ $\dfrac{V_{CC}}{3} = \dfrac{2V_{CC}}{3} \cdot e^{-\frac{T_1}{CR_2}}$ $\Rightarrow$ $T_1 = CR_2 \ln 2$

za $t = T_1 + T_2$ je $v_A = \dfrac{2V_{CC}}{3}$ $\Rightarrow$ $\dfrac{2V_{CC}}{3} = V_{CC} - \dfrac{2V_{CC}}{3} \cdot e^{-\frac{T_2}{C(R_1+R_2)}}$ $\Rightarrow$ $T_2 = C(R_1 + R_2) \ln 2$

$$f = \frac{1}{T_1 + T_2} = \frac{1}{C(R_1 + 2R_2) \ln 2}$$