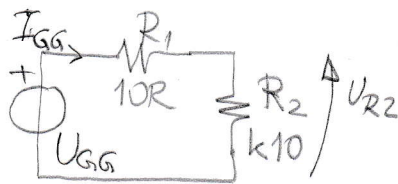
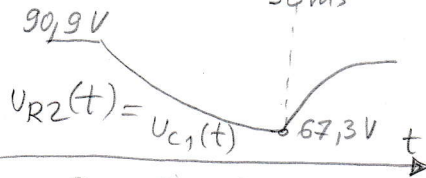
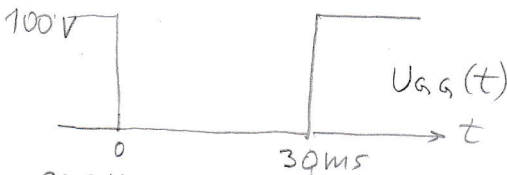


①



$$U_{GG} = (R_1 + R_2) I_{GG} \Rightarrow I_{GG} = \frac{U_{GG}}{R_1 + R_2} = \frac{100}{110} = 0,909 \text{ A}; U_{R2} = 100 \cdot 0,909 = 90,9 \text{ V}$$



$$U_{C1}(0) = 90,9 \text{ V}$$

$$U_{C1}(t) = U_{C1}(0) \cdot e^{-\frac{t}{\tau}}$$

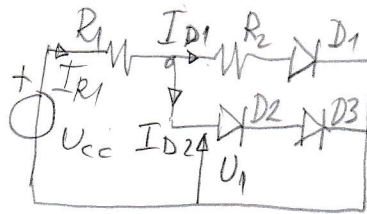
$$\tau = R_2 \cdot C_1 = 100 \cdot 10^{-3} = 100 \text{ ms}$$

$$U_{C1}(t_1) = U_{C1}(0) \cdot e^{-\frac{0,03}{0,1}} = 67,3 \text{ V}$$

$$i_{GG}(t_1+0) = \frac{U_{GG} - U_{C1}(t_1)}{R_1}$$

$$i_{GG}(t_1+0) = \frac{100 - 67,3}{10} = 3,27 \text{ A}$$

②



$$I_{R1} = \frac{U_{cc} - U_1}{R_1} = \frac{5 - 1,2}{1000} = 3,8 \text{ mA}$$

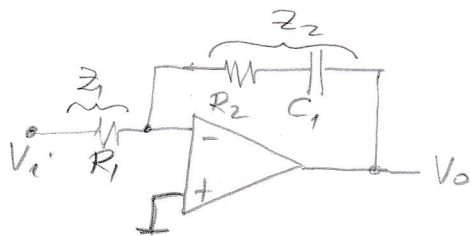
$$U_1 = U_{D2} + U_{D3} = 2 \cdot 0,6 = 1,2 \text{ V}$$

$$U_1 = U_{R2} + U_{D1} \Rightarrow U_{R2} = U_1 - U_{D1} = 1,2 - 0,6 = 0,6 \text{ V}$$

$$I_{D1} = \frac{U_1 - U_{D1}}{R_2} = \frac{1,2 - 0,6}{1000} = 0,6 \text{ mA}$$

$$I_{D2} + I_{D3} = I_{R1} \Rightarrow I_{D2} = I_{D3} = I_{R1} - I_{D1} = 3,8 - 0,6 = 3,2 \text{ mA}$$

③



$$A(j\omega) = \frac{V_o(j\omega)}{V_i(j\omega)} = -\frac{z_2}{z_1}$$

$$z_1 = R_1$$

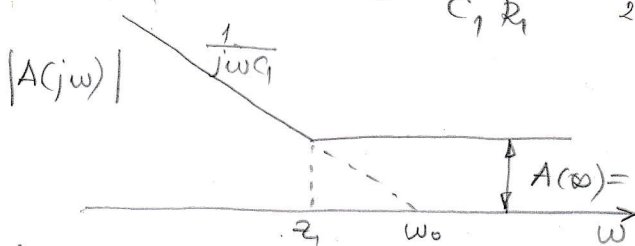
$$z_2 = R_2 + \frac{1}{j\omega C_1} = \frac{1 + j\omega C_1 R_2}{j\omega C_1}$$

$$A(j\omega) = -\frac{1 + j\omega C_1 R_2}{j\omega C_1 R_1} = -\left(\frac{V_{C1} R_2}{j\omega}\right) \cdot \left(1 + \frac{j\omega}{1/C_1 R_2}\right); |A(\infty)| = \frac{R_2}{R_1} = 12$$

$$p = 0;$$

$$z = \frac{1}{C_1 R_2} = \frac{1}{22 \cdot 10^{-9} \cdot 120 \cdot 10^3} = 378,8 \text{ rad/s}; f_z = 60,3 \text{ Hz}$$

$$\omega_0 C_1 R_1 = 1 \Rightarrow \omega_0 = \frac{1}{C_1 R_1} = \frac{1}{22 \cdot 10^{-9} \cdot 10^4} = 4545 \text{ rad/s}; f_0 = 723 \text{ Hz}$$



$$A(\infty) = 12; A(\infty) [\text{dB}] = 20 \log 12 = 21,6 \text{ dB}$$

