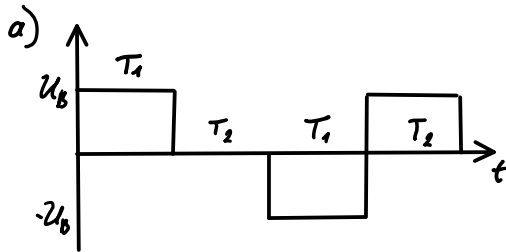


a-e)



$$f_s = \frac{1}{T_s} = 1 \text{ GHz}$$

b)

$$\underline{F}(p) = \frac{\underline{U}_c(p)}{\underline{U}_s(p)} = \frac{R}{p^2 LCR + pL + R} \quad p_1 \approx -19,5 \text{ GHz} \quad p_2 \approx -513 \text{ MHz}$$

c)

$$\underline{U}_c(p) = \underline{F}(p) \cdot \underline{U}_s(p) = \frac{U_b R}{p(p^2 LCR + pL + R)}$$

d)

$$\underline{U}_s(p) = \frac{U_b}{LC} \frac{1}{p(p^2 + p\frac{1}{CR} + \frac{1}{LC})} = \frac{U_b}{LC} \left(\frac{A}{p} + \frac{B}{p-p_1} + \frac{C}{p-p_2} \right)$$

$$p=0: \frac{1}{p_1 p_2} = A \approx 10,0 \cdot 10^{-20} \text{ s}^2 \Rightarrow u_c(t) = \frac{U_b}{LC} (A s(t) + B s(t) e^{p_1 t} + C s(t) e^{p_2 t})$$

$$p=p_1: \frac{1}{p_1(p_1-p_2)} = B \approx 2,70 \cdot 10^{-21} \text{ s}^2 \quad u_c(T_1) \approx 0,471 \text{ V}$$

$$p=p_2: \frac{1}{p_2(p_2-p_1)} = C \approx -1,03 \cdot 10^{-19} \text{ s}^2$$

$$i_L = i_c + i_R = C \frac{du_c}{dt} + \frac{u_c}{R} \quad i_L(T_1) \approx 2,32 \text{ mA} + \frac{0,471 \text{ V}}{50 \Omega} \approx 11,7 \text{ mA}$$

e)

$$\tilde{t} = t - T_1; \quad u_s = u_L + u_c = L \frac{di_L}{dt} + u_c; \quad \frac{di_L}{dt} = C \frac{d^2 u_c}{d\tilde{t}^2} + \frac{1}{R} \frac{du_c}{d\tilde{t}}$$

$$u_s(\tilde{t}) = LC \frac{d^2 u_c}{d\tilde{t}^2} + \frac{L}{R} \frac{du_c}{d\tilde{t}} + u_c \quad u_s(\tilde{t}=0)$$

$$\underline{U}_c(p) = \frac{U_{c0}(p + \frac{1}{RC}) + U'_{c0}}{p^2 + \frac{1}{RC}p + \frac{1}{LC}}$$

$$\frac{U_{c0}(p + \frac{1}{RC}) + U'_{c0}}{(p-p_3)(p-p_4)} = \frac{D}{p-p_3} + \frac{E}{p-p_4}$$

$$p_{3/4} = p_{1/2}$$

$$p=p_3: D = \frac{U_{c0}(p_3 + \frac{1}{RC}) + U'_{c0}}{p_3 - p_4}$$

$$p=p_4: E = \frac{U_{c0}(p_4 + \frac{1}{RC}) + U'_{c0}}{p_4 - p_3}$$

$$u_c(\tilde{t}) = D s(\tilde{t}) e^{p_3 \tilde{t}} + E s(\tilde{t}) e^{p_4 \tilde{t}}$$

$$u_c(t) = D s(t-T_1) e^{p_1(t-T_1)} + E s(t-T_1) e^{p_2(t-T_1)}$$