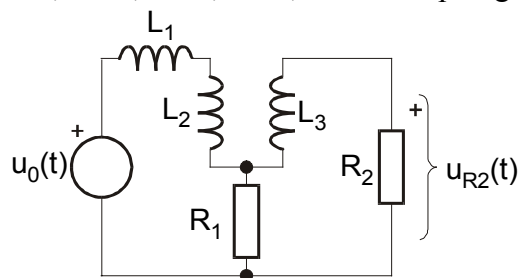
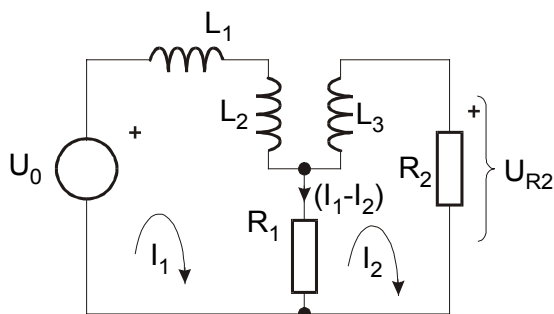


1.A. Za mrežu prikazanu slikom izračunati napon $u_{R2}(t)$ ako su zadane normalizirane vrijednosti elemenata: $R_1=1, R_2=1, L_1=1, L_2=2, L_3=4$ te napon generatora $u_0(t)=S(t)$.

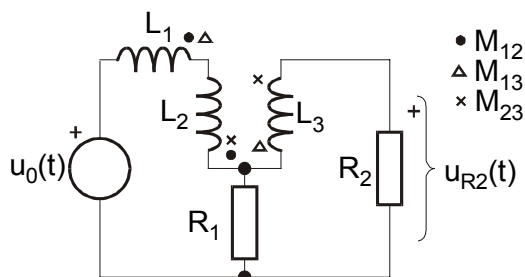


Rješenje:

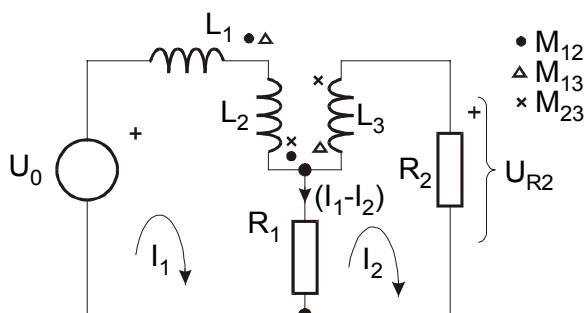


$$U_{R2}(s) = \frac{1}{s(12s^2 + 10s + 1)} \Rightarrow u_{R2}(t) = \mathcal{L}^{-1}[U_{R2}(s)]$$

1.B. Za mrežu prikazanu slikom izračunati napon $u_{R2}(t)$ ako su zadane normalizirane vrijednosti elemenata: $R_1=1, R_2=1, L_1=1, L_2=2, L_3=4, M_{12}=1/2, M_{13}=2, M_{23}=3$ te napon generatora $u_0(t)=S(t)$.

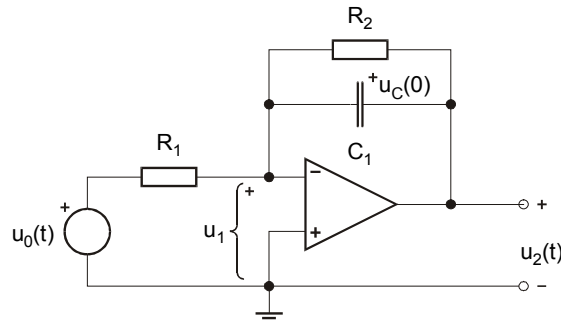


Rješenje:



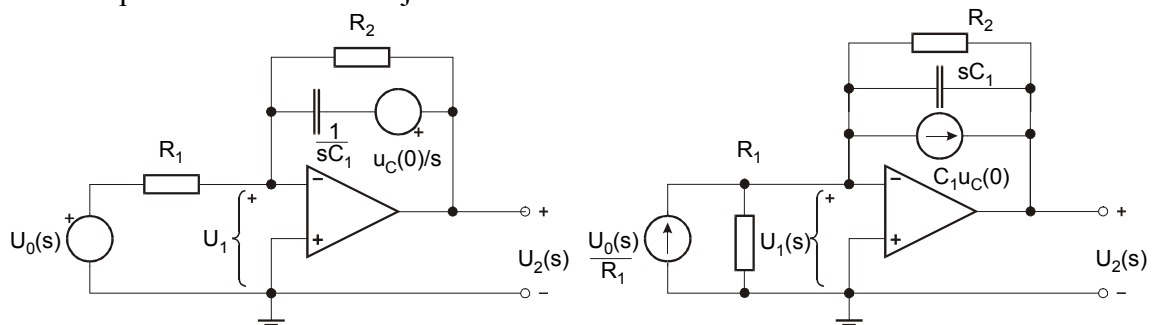
$$U_{R2}(s) = \frac{1}{s} + \frac{0.186}{(s + 0.8554)} - \frac{1.186}{(s + 0.0780)} \Rightarrow u_{R2}(t) = [1 + 0.186 \cdot e^{-0.8554t} - 1.186 \cdot e^{-0.0780t}] \cdot S(t).$$

2. Za mrežu na slici odrediti i skicirati odziv napona $u_2(t)$ ako je zadano: $u_0(t) = S(t)$, $R_1 = 1$, $R_2 = 1$, $C_1 = 1$, $u_C(0) = 1$. Odziv izračunati rješavanjem Laplaceove transformacije.

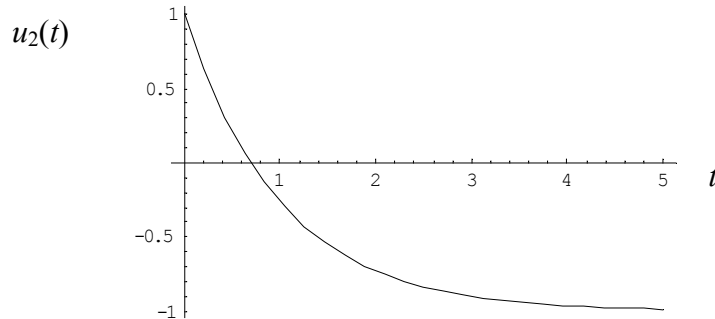


Rješenje:

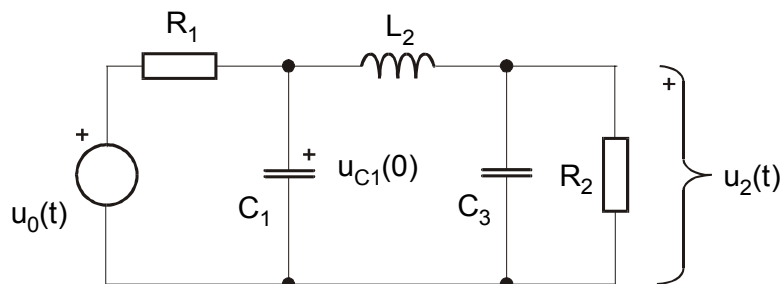
Pomoću Laplaceove transformacije dobivamo:



$$U_2(s) = \frac{2}{s+1} - \frac{1}{s} \Rightarrow u_2(t) = 2 \cdot e^{-t} \cdot S(t) - S(t)$$

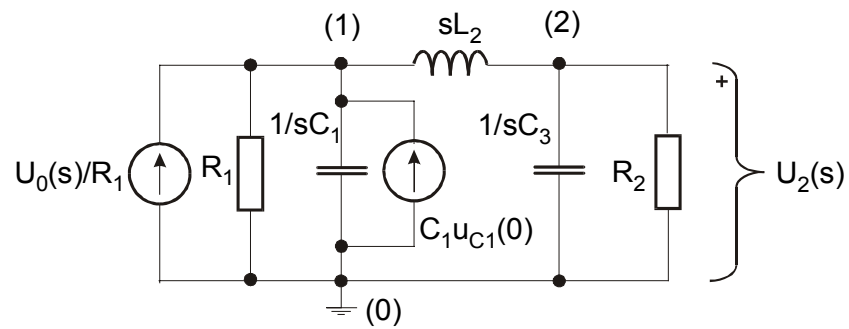


3. Izračunati odziv napona $u_2(t)$ na otporu R_2 za mrežu prikazanu slikom. Zadano je: pobuda $u_0(t) = \delta(t)$, početni napon na kapacitetu C_1 je $u_{C1}(0) = 1$ i normalizirane vrijednosti elemenata $R_1 = R_2 = 1$, $C_1 = C_3 = 1$, $L_2 = 2$.



Rješenje:

Pomoću Laplaceove transformacije dobivamo:



$$U_2(s) = \frac{1}{(s+1)(s^2+s+1)}$$

$$U_2(s) = \frac{1}{s+1} - \frac{s}{s^2+s+1} \Rightarrow u_2(t) = \left[e^{-t} - e^{-\frac{t}{2}} \cos \frac{\sqrt{3}}{2} t + \frac{1}{\sqrt{3}} e^{-\frac{t}{2}} \sin \frac{\sqrt{3}}{2} t \right] \cdot S(t)$$