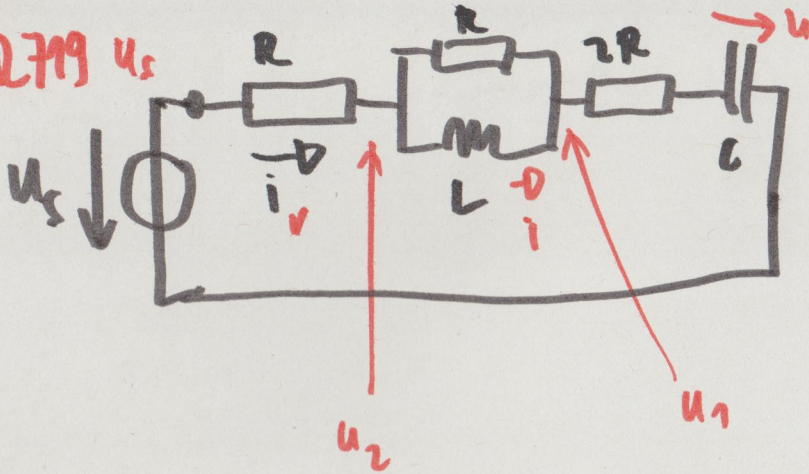


HL 719 u_s



$$-i' + \frac{u_1 - u_2}{L} + Cu' = 0$$

$$\frac{u - u_1}{2R} + Cu' = 0$$

$$u_2 = u_1 + Li'$$

$$i = \frac{u_s - u_2}{R}$$

$$\frac{u_2 - u_1}{R} + \frac{u_2 - u_s}{R} + i = 0$$

$$A = \begin{pmatrix} -\frac{1}{4RC} & \frac{1}{4C} \\ -\frac{1}{4L} & -\frac{3R}{4L} \end{pmatrix}$$

$$\begin{cases} u' = -\frac{1}{4RC}u + \frac{1}{4C}i + \frac{1}{4RC}u_s \\ i' = -\frac{1}{4L}u - \frac{3R}{4L}i + \frac{1}{4L}u_s \\ i_s' = -\frac{1}{4R}u + \frac{1}{4}i + \frac{1}{4R}u \end{cases}$$

$$\left(\lambda + \frac{1}{4RC}\right)\left(\lambda + \frac{3R}{4L}\right) + \frac{1}{16LC} = 0$$

$$\lambda^2 + \lambda\left(\frac{1}{4RC} + \frac{3R}{4L}\right) + \left(\frac{1}{16LC} + \frac{3}{16LC}\right) = 0$$

Hurwitz-polynom $\frac{1}{4LC} \rightarrow$ stabil

lsg: $\left(\frac{L+3R^2C}{4LRC}\right)^2 - 4 \cdot 1 \cdot \frac{1}{4LC} < 0$

~~NA~~ $\frac{(L+3R^2C)^2 - 4R \cdot 4RLC}{(4LRC)^2} < 0$

nur tgl. und \rightarrow nur bei lsgs \uparrow

Lehttröjan enen hälsö rätthel luvjö mygödelist karpni?

⇒ ?

$$L = 1 \mu\text{H}; C = 1 \text{pF}; R = 2 \text{k}\Omega;$$

$$u_s(t) = U_0 \cdot \varepsilon(t) \quad \text{ms, k}\Omega, \mu\text{H}, \text{pF}, \text{V, A}$$

MR719/2

$$3) \underline{x}_g = \begin{pmatrix} U \\ I \end{pmatrix} = \begin{pmatrix} 10 \\ 0 \end{pmatrix}$$

$$4) \underline{k} = \begin{pmatrix} -10,5496 \\ -1,9861 \end{pmatrix}$$

$$1) \underline{A} = \begin{pmatrix} -0,125 & 0,25 \\ -0,25 & -1,5 \end{pmatrix}$$

$$\underline{B} = \begin{pmatrix} 0,125 \\ 0,25 \end{pmatrix}$$

$$\underline{C}^T = (-0,125 \quad 0,25)$$

$$\underline{D} = 0,125$$

$$u(t) = -10,3675 e^{-0,1721 \cdot t} + 0,3675 \cdot e^{-1,4529 t} + 10$$

$$i(t) = 1,9518 e^{-0,1721 t} - 1,9518 e^{-1,4529 t} + 10$$

(t > 0)

$$2) \lambda_1 = -0,1721 \text{ ns}^{-1}; \underline{m}_1 = \begin{pmatrix} 0,9827 \\ 0,7885 \\ -0,1950 \end{pmatrix}$$

$$\lambda_2 = -1,4529 \text{ ns}^{-1}; \underline{m}_2 = \begin{pmatrix} -0,185 \\ 0,9827 \end{pmatrix}$$