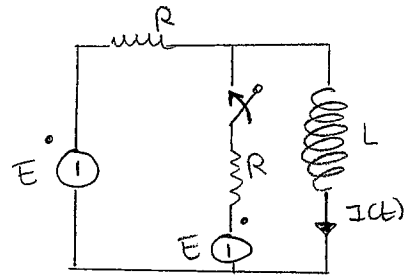
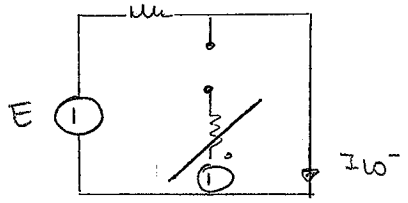
15-06-2015



$E(t) = 100\,V$

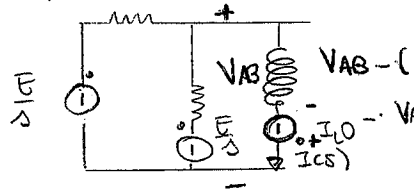
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$t < 0$ TASTO APERTO → REGIME IN CONTINUA



$$I_0^- = \frac{E}{R} = \frac{100}{10} = 10$$

$t > 0$ TASTO CHIUSO



$$V_{AB} = \frac{\frac{E}{S}\cdot\frac{1}{R} + \frac{E}{S}\frac{1}{R} - \frac{I_0^- L}{LS}}{\frac{1}{R} + \frac{1}{R} + \frac{1}{LS}} =$$



$$= \frac{\frac{10}{S} + \frac{10}{S} - \frac{10\cdot 0{,}1}{S\cdot 0{,}1}}{\frac{1}{10} + \frac{1}{10} + \frac{1}{0{,}1S}} = \frac{1}{S}\,\frac{(10)}{\left(\frac{1S}{10} + \frac{1S}{10} + \frac{1}{0{,}1}\right)\frac{1}{S}} = \frac{10}{\frac{2S}{10} + 10} =$$

$$= \frac{10}{\frac{2}{10}\left(S + \frac{10}{2}\cdot 10\right)} = \frac{10}{\frac{2}{10}(S+50)}$$

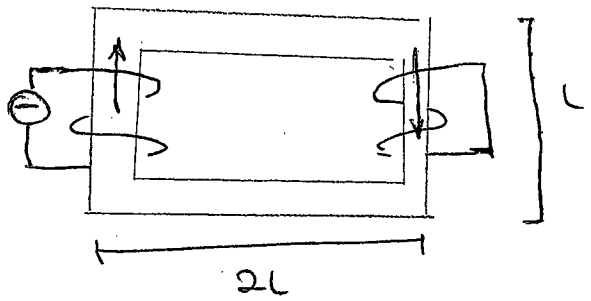
$$I(s) = \frac{\frac{10}{\frac{2}{10}(S+50)} + 10(0{,}1)}{SL} = \frac{\frac{50 + S + 50}{S+50}}{SL} =$$

$$= \frac{S+100}{0{,}1\,(S+50)S}$$

$$A = \lim_{S\to 0} \frac{S+100}{0{,}1\cdot 50} = 20 \qquad B = \lim_{S\to -50} \frac{-50+100}{0{,}1(-50)} = \frac{-50}{S} = -10$$

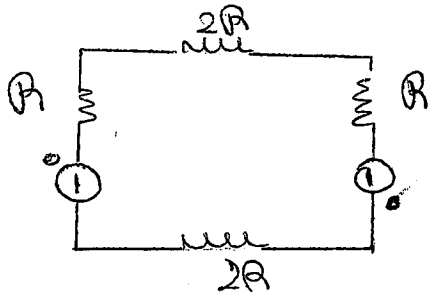
$$I(t) = (20 - 10e^{-50t})u(t)$$

ESERCIZIO 9



$$\mathcal{R} = \frac{4\pi \cdot 10^{-2}}{4\pi \cdot 10^{-7} \cdot 1000 \cdot 10 \cdot 10^{-4}} = 796{,}8$$

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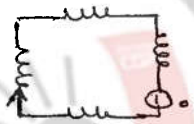
$$L_1 = \frac{N_1^2}{\mathcal{R}_{V1}}$$

$$\mathcal{R}_{V2} = \mathcal{R}_{V2} = R + 2R + R + 2R = 6R = 4777{,}07$$

$$L_1 = \frac{100^2}{\mathcal{R}_{V1}} = 0.0209\ H$$

$$L_2 = \frac{N_2^2}{\mathcal{R}_{V2}} = 0.047\ H$$

$M \rightarrow \frac{\phi_1^{TC}}{i_2}\Big|_{i_1 = 0}$

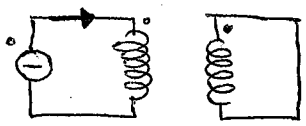


$$\phi_1 = \phi_2 = \frac{N_2 i_2}{\mathcal{R}_{V1}}$$

$$\phi_{1TC} = \frac{N_2 i_2 N_1}{\mathcal{R}_{V1}}$$

$$M = \frac{N_2 N_1}{\mathcal{R}_{V1}} = 0.0314\ H$$

→ CIRCUITO ELETTRICO



$M > 0$

$$\dot{I}_1 = \frac{15}{\sqrt{2}}$$

$$|I_{1EFF}| = \sqrt{\frac{15}{\sqrt{2}}}^2$$

FLUSSI CONCORDI
M > 0
CONTRASSEGNO
DALLO STESSO
LATO

$0 - (-\pi)$

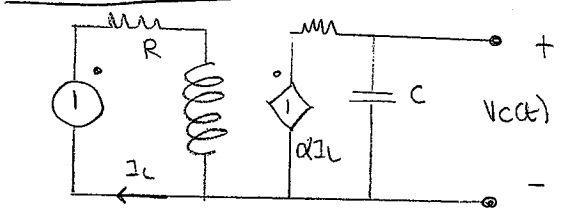
$$W_{M12} = \frac{1}{2} L_1 |I_{1EFF}|^2 + \frac{1}{2} L_2 I_{2EFF}^2 + M I_1 I_2 \cos(\phi_1 - \phi_2) \quad \cos(\pi) = -1$$

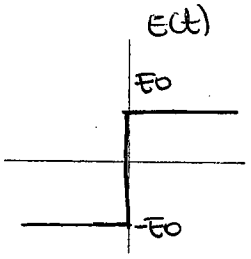
$$= 1{,}176 + 1{,}177 - 2{,}354 = 0$$

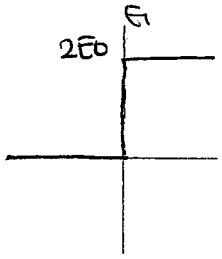
$$\begin{cases} \dot{V}_2 = j\omega \dot{I}_2 L_2 + M j\omega \dot{I}_1 \\ \dot{I}_2 = \frac{-j\omega M \dot{I}_1}{j\omega L_2} = \frac{0{,}0314}{0.047} \cdot \frac{15}{\sqrt{2}} = 7{,}07 \end{cases}$$

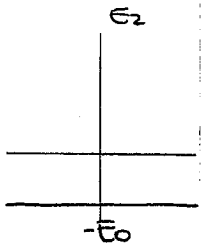
18-02-2016

ESERCIZIO 3

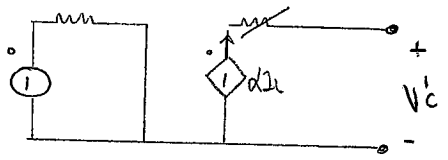








1) AGISCE SOLO E_2

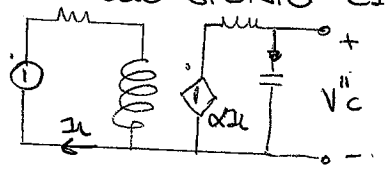


$$I_L'(t) = \frac{E_2}{R} = \frac{-E_0}{R} = \frac{-10}{20} = -\frac{1}{2}$$

$$V_c'(t) = \alpha I_L = 10 \cdot \left(-\frac{1}{2}\right) = -5\,V$$

2) AGISCE E_1

$t<0$ TUTTO SPENTO $C_1 = \emptyset$



$t>\emptyset$

$$E_1 = \frac{2E_0}{S} = \frac{20}{S}$$

$$I_L'' = \frac{E_1}{R+SL} = \frac{\frac{2E_0}{S}}{R+SL} = \frac{20}{S}\,\frac{1}{20+S2} = \frac{20}{S2(S+10)} = \frac{10}{S(S+10)}$$

$$I_x'' = \frac{\alpha I_L}{R+\frac{1}{CS}} = \frac{10}{20+\frac{1}{0.5S}} \cdot \frac{10}{S(S+10)}$$

$$V_c'' = \frac{\alpha I_L}{R+\frac{1}{CS}} \cdot \frac{1}{CS} = \frac{10}{S} \cdot \frac{1}{(S+10)} \cdot \frac{10}{20+\frac{1}{0.5S}} \cdot \frac{1}{0.5\cdot S} = \frac{10}{S^2} \cdot \frac{1}{10+S} \cdot \frac{10}{10S+1}$$

$$= \frac{100}{S\cdot 10} \cdot \frac{1}{S+10} \cdot \frac{1}{S+\frac{1}{10}} = \frac{10}{S} \cdot \frac{1}{(S+10)\left(S+\frac{1}{10}\right)}$$

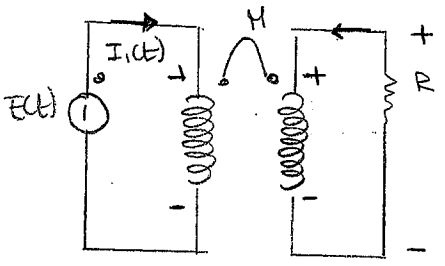
$$A = \lim_{S\to 0} \frac{10}{10\cdot\frac{1}{10}} = 10 \qquad B = \lim_{S\to -10} \frac{10}{-10}\,\frac{1}{-10+\frac{1}{10}} = 0{,}101$$

$$B = \lim_{S\to -\frac{1}{10}} \frac{10}{-\frac{1}{10}} \cdot \frac{1}{\left(-\frac{1}{10}+10\right)} = -10{,}101$$

$$V_c(t) = \begin{cases} -5 \\ \left(10 + 0{,}101\,e^{-10t} - 10{,}101\,e^{-\frac{1}{10}t}\right) u(t) \end{cases} \qquad t>\emptyset$$

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$$\begin{cases} \dot{V}_1 = \dot{E} = j\omega L_1 \dot{I}_1 + j\omega M \dot{I}_2 \\ \dot{V}_2 = j\omega L_2 \dot{I}_2 + j\omega M \dot{I}_1 \end{cases}$$

$$\begin{cases} \dot{E} = 10j\dot{I}_1 + 10j\dot{I}_2 \\ -R\dot{I}_2 = 10j\dot{I}_2 + 10j\dot{I}_1 \end{cases}$$

$\dot{E} = 100$

$\dot{V}_2 = -R\dot{I}_2$

$$\frac{100 - 10j\dot{I}_2}{10j} = \dot{I}_1$$

$$-R\dot{I}_2 = 10j\dot{I}_2 + 10j\left(\frac{100 - 10j\dot{I}_2}{10j}\right)$$

$$-R\dot{I}_2 = 10j\dot{I}_2 + 100 - 10j\dot{I}_2$$

$$\dot{I}_2 = \frac{100}{-10} = -10$$

$$\dot{I}_1 = \frac{100 - 10j(-10)}{10j} = \frac{100 + 100j}{10j} = -10j + 10$$

$|I_1| = \sqrt{200}$

$\angle I_1 = \arccot(-1)$

$$I_1(t) = \sqrt{200} \cdot \sqrt{2} \cdot \cos\left(1000t - \frac{\pi}{4}\right)$$

$$W_{L_1 L_2} = \frac{1}{2} I_{1\,EFF}^2 L_1 + \frac{1}{2} L_2 I_{2\,EFF}^2 \pm M |I_1| |I_2| \cos(\phi_1 - \phi_2)$$

$\phi_2 = -180$

$$\frac{1}{2} \cdot 200 \cdot 10^{-2} + \frac{1}{2} 10^{-2} \cdot 100 + 10^{-2} (\sqrt{200}) \cdot 10 \cos\left(-\frac{\pi}{4} - (-180)\right)$$

$$1 + \frac{1}{2} + 10^{-2} \cdot 10 \cdot \sqrt{200} \frac{\sqrt{2}}{2} = 1 + \frac{1}{2} - 1$$

$P_E = ?$

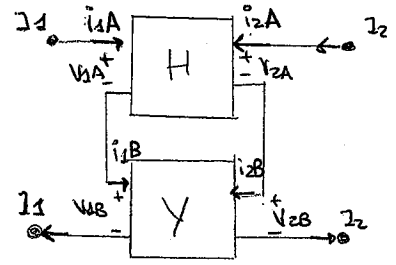
$S_E = \dot{E}(10 + j10) = 100(10 + j10)$

$P_E = \mathrm{Re}\{S_E\} = 1000$ $\quad Q_E = 1000$

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20-07-2016

ES 2



$$H = \begin{bmatrix} 2 & j \\ -j & 1 \end{bmatrix} \qquad Y = \begin{bmatrix} 3 & j \\ 0 & 2 \end{bmatrix}$$

DETERMINARE I PARAMETRI $\overline{Z}$

$$\begin{cases} \dot{I}_1 = \dot{I}_{1A} = \dot{I}_{1B} \\ \dot{I}_2 = \dot{I}_{2A} + \dot{I}_{2B} \end{cases}$$

$$\begin{cases} \dot{V}_{1A} = 2\dot{I}_{1A} + j\dot{V}_{2A} \\ \dot{I}_{2A} = -j\dot{I}_{1A} + \dot{V}_{2A} \end{cases} \qquad \begin{cases} \dot{I}_{1B} = 3\dot{V}_{1B} + j\dot{V}_{2B} \\ \dot{I}_{2B} = 2\dot{V}_{2B} \end{cases} \qquad \begin{cases} \dot{V}_1 = \dot{V}_{1A} + \dot{V}_{1B} \\ \dot{V}_2 = \dot{V}_{2A} + \dot{V}_{2B} \end{cases}$$

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TRASFORMO H IN $\overline{Z}$

$$\overline{Z}_{11} = \left.\frac{\dot{V}_1}{\dot{I}_1}\right|_{\dot{I}_2=\emptyset} \qquad \overline{Z}_{21} = \left.\frac{\dot{V}_2}{\dot{I}_1}\right|_{\dot{I}_2=\emptyset} \qquad \overline{Z}_{22} = \left.\frac{\dot{V}_2}{\dot{I}_2}\right|_{\dot{I}_1=0} \qquad \overline{Z}_{12} = \left.\frac{\dot{V}_1}{\dot{I}_2}\right|_{\dot{I}_1\neq 0}$$

CERCO $\overline{Z}_{11}$ ⇒ IMPONGO $\dot{I}_2 = 0$

$$\begin{cases} \dot{V}_1 = 2\dot{I}_1 + j\dot{V}_2 \\ 0 = -j\dot{I}_1 + \dot{V}_2 \end{cases} \rightarrow \begin{cases} \dot{V}_1 = 2\dot{I}_1 + j(j\dot{I}_1) \\ \dot{V}_2 = j\dot{I}_1 \end{cases} \rightarrow \dot{V}_1 = 2\dot{I}_1 - \dot{I}_1 \quad \dot{V}_1 = \dot{I}_1 \quad \boxed{\overline{Z}_{11} = 1}$$

$$\dot{V}_2 = j\dot{I}_1$$

$\overline{Z}_{21}$

$$\begin{cases} \dot{V}_1 = 2\dot{I}_1 + j\dot{V}_2 \\ 0 = -j\dot{I}_1 + \dot{V}_2 \end{cases} \rightarrow \dot{V}_2 = j\dot{I}_1 \qquad \frac{\dot{V}_2}{\dot{I}_1} = j \qquad \boxed{\overline{Z}_{21} = j}$$

$\overline{Z}_{12}$ $\quad \dot{I}_1 = 0$

$$\begin{cases} \dot{V}_1 = 2\cdot 0 + j\dot{V}_2 \\ \dot{I}_2 = \dot{V}_2 \end{cases} \qquad \overline{Z}_{12} = \frac{\dot{V}_1}{\dot{I}_2} \Rightarrow \dot{V}_1 = j\dot{I}_2 \qquad \overline{Z}_{12} = j \qquad \boxed{\overline{Z}_{12} = j}$$

$$\overline{Z}_{22} = \left.\frac{\dot{V}_2}{\dot{I}_2}\right|_{\dot{I}_1=0} = 1 \qquad \boxed{\overline{Z}_{22} = 1}$$

TRASFORMO Y IN $\overline{Z}$

$\overline{Z}_{11}$ ⇒ IMPONGO $\dot{I}_2 = 0$

$$\begin{cases} \dot{I}_1 = 3\dot{V}_1 + j\dot{V}_2 \\ 0 = 2\dot{V}_2 \end{cases} \qquad \overline{Z}_{11} = \frac{\dot{V}_1}{\dot{I}_1} = \frac{1}{3} \qquad \overline{Z}_{11} = 0$$

IMPONGO $\dot{I}_1 = \emptyset$

$$\begin{cases} 0 = 3\dot{V}_1 + j\dot{V}_2 \\ \dot{I}_2 = 2\dot{V}_2 \end{cases} \qquad \overline{Z}_{12} \Rightarrow 0 = 3\dot{V}_1 + j\frac{\dot{I}_2}{2} \qquad \frac{\dot{V}_1}{\dot{I}_2} = -j/6$$

$$\overline{Z}_{22} = 1/2$$

ALTRIMENTI POTEVI FARE Y^{-1}

SOMMO LE MATRICI $\overline{Z}$

$$\begin{cases} \overline{Z}_{11} = \overline{Z}_{A11} + \overline{Z}_{B11} \end{cases} \qquad \begin{pmatrix} 0 & 0{,}3j \\ j & \frac{3}{2} \end{pmatrix}$$

ATTENTA $\quad \begin{pmatrix} \overline{Z}_{11} & \overline{Z}_{12} \\ \overline{Z}_{21} & \overline{Z}_{22} \end{pmatrix}$