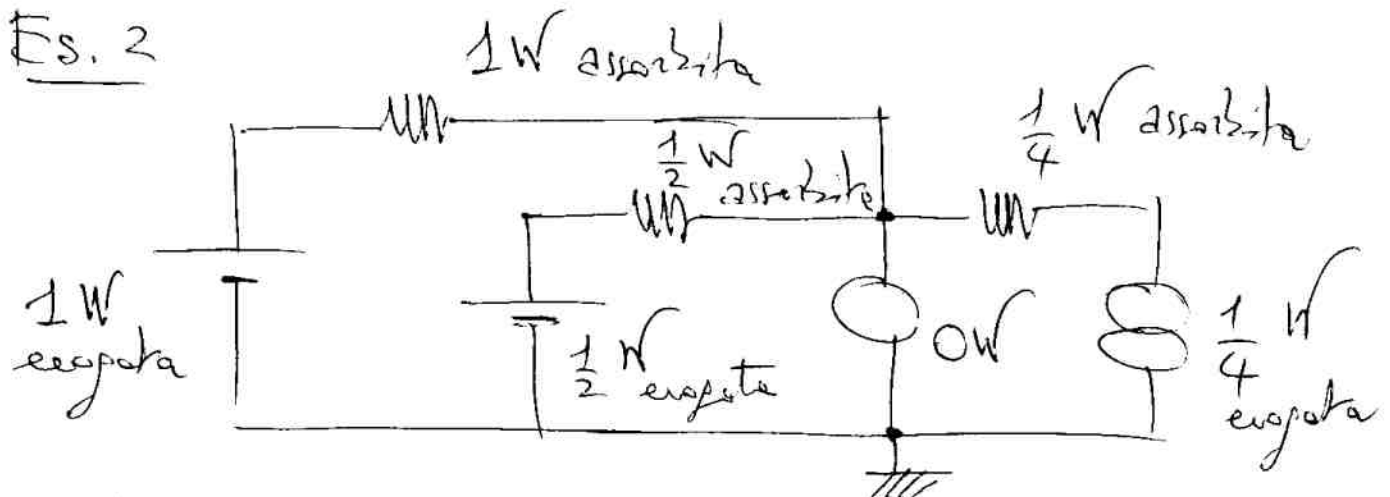


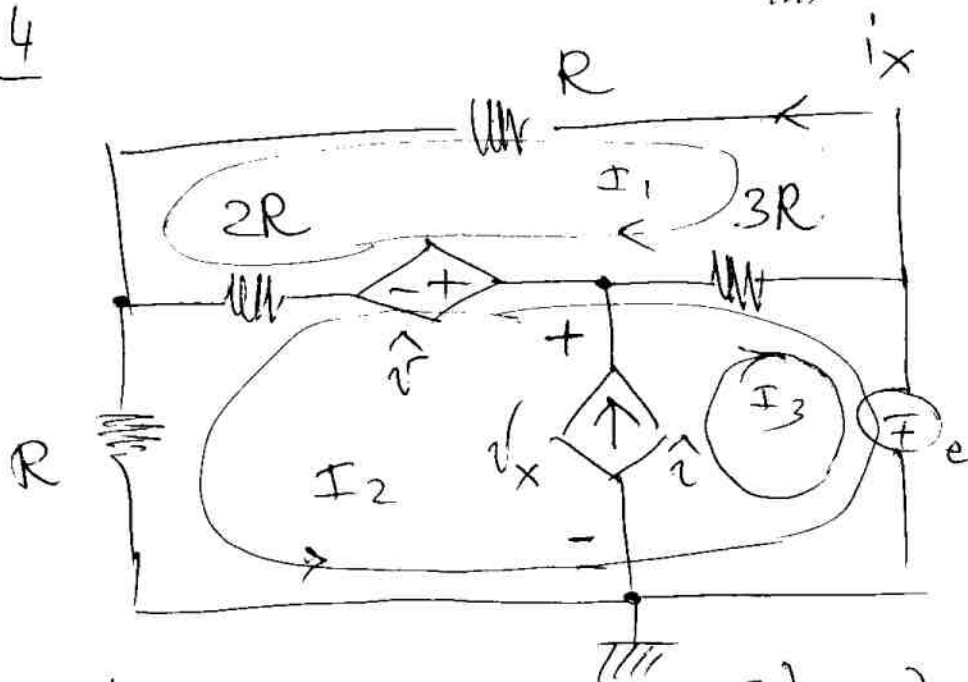
Risultati Prove Scritte di 2/7
Elettrotecnica I (A.A. 06/07)

Compilazione 1 (9 Novembre 06)

Es. 1 $V_{eq} = \frac{E}{2}$; $R_{eq} = 2R$.



Es. 4



$$\hat{v} = R i_x$$

$$\hat{i} = 2 i_x$$

incognite: I_1, I_2, I_3 (base)

effettive: v_x

(ausiliaria: i_x)

- KVL auf $\begin{bmatrix} 6R & 5R & -3R \\ 5R & 6R & -3R \\ -3R & -3R & 3R \end{bmatrix} \begin{bmatrix} I_1 \\ I_2 \\ I_3 \end{bmatrix} = \begin{bmatrix} -\hat{v} \\ -e - \hat{v} \\ e + \hat{v}_x \end{bmatrix}$ 2/7

- Vinesla gen. re corrente:

$$\hat{i} = I_3 \quad (1)$$

- relazione costitutiva generator controllato:

$$\hat{i} = 2i_x = 2(-I_2) \quad (2)$$

$$\hat{v} = Ri_x = R(-I_2)$$

- queste equazioni (da (1) e (2))

$$2I_1 + I_3 = 0.$$

Sistema risolvibile:

$$\begin{bmatrix} 5R & 5R & -3R & 0 \\ 4R & 6R & -3R & 0 \\ -3R & -3R & 3R & -1 \\ 2 & 0 & 1 & 0 \end{bmatrix} \begin{bmatrix} I_1 \\ I_2 \\ I_3 \\ v_x \end{bmatrix} = \begin{bmatrix} 0 \\ -e \\ e \\ 0 \end{bmatrix}.$$

Compilino 2

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Es. 1

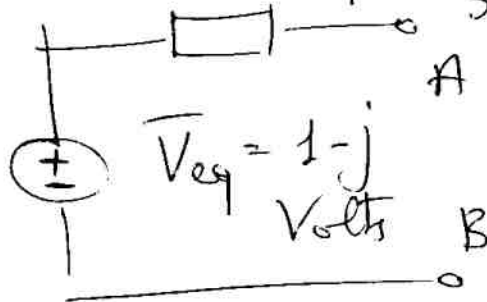
$$P_{AB} = 4798 \text{ Watt}$$

$$Q_{AB} = 600 \text{ VAR}$$

Es. 2

C. to equivalente d. Thevenin
del bipolo AB:

$$\bar{Z}_{eq} = \frac{1}{5} - j\frac{3}{5} \Omega$$



$$\bar{Z}_{carico} = \bar{Z}_{eq}^* = \frac{1}{5} + j\frac{3}{5} \Omega$$

$$P_{MAX} = \frac{5}{4} \text{ Watt.}$$

$$\bar{Z}_y :$$

The diagram shows three components connected in series. From top to bottom: a capacitor (two parallel lines) labeled $\frac{3}{10} \text{ H}$, an inductor (a coil) labeled $\frac{1}{5} \Omega$, and a resistor (a zigzag line).

Es. 3

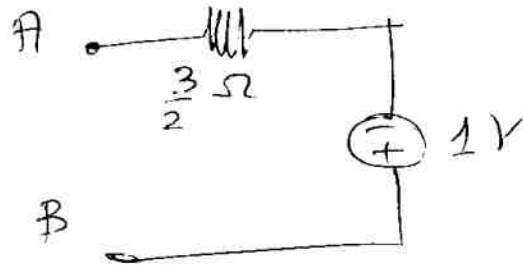
$$v_c(t) = 3e^{-\frac{2}{3}t}, \quad t \geq 0 \text{ (libera)}$$

$$v_c(t) = 2(1 - e^{-\frac{2}{3}t}), \quad t \geq 0 \text{ (forzata).}$$

Recupero 1, P1 (14 Dicembre 06)

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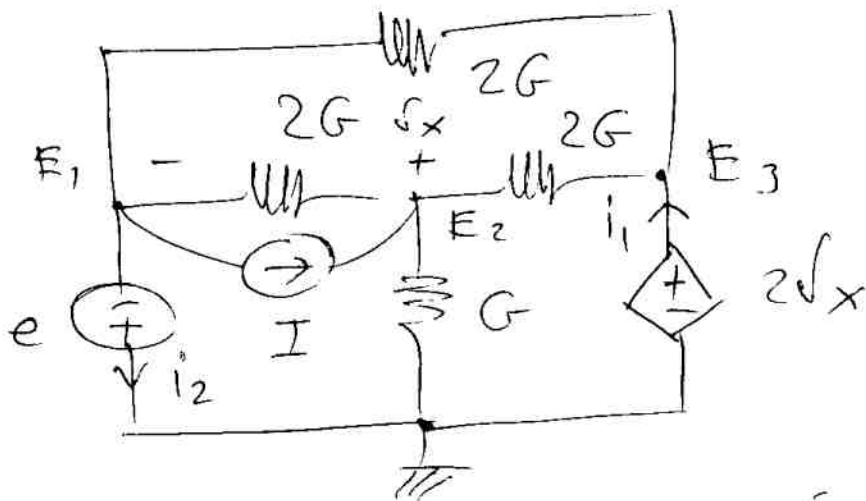
Es. 1



Es. 2

$$P_{\text{gen. entr}} = \frac{72}{25} \text{ Watt}$$

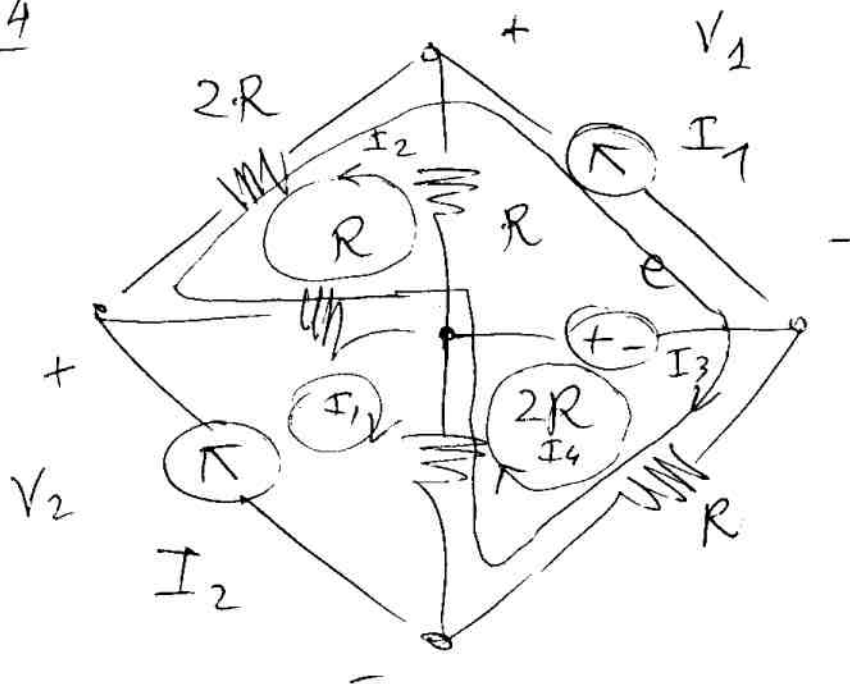
Es. 3



$$\begin{bmatrix} 4G & -2G & -2G & 0 & 1 \\ -2G & 5G & -2G & 0 & 0 \\ -2G & -2G & 4G & -1 & 0 \\ 1 & 0 & 0 & 0 & 0 \\ 2 & -2 & 1 & 0 & 0 \end{bmatrix} \begin{bmatrix} E_1 \\ E_2 \\ E_3 \\ i_1 \\ i_2 \end{bmatrix} = \begin{bmatrix} -I \\ I \\ 0 \\ -e \\ 0 \end{bmatrix}$$

Es. 4

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$$\begin{bmatrix} +3R+R & -3R & -2R \\ +R+4R & -3R & 0 \\ -3R-3R & +6R & +3R \\ -2R & 0 & +3R+3R \end{bmatrix} \begin{bmatrix} I_1 \\ I_2 \\ I_3 \\ I_4 \end{bmatrix} = \begin{bmatrix} V_2 \\ 0 \\ -V_1 \\ -e \end{bmatrix}$$

$$I_1 = -I_3 \quad ; \quad I_2 = I_4 \quad (\text{voci generatori di corrente}).$$

Es. 1 $C = 0.795 \text{ nF}$

$$\bar{I}_1 = -j10 ; \quad \bar{I}_2 = 10$$

$$\bar{I}_3 = 16 - j12 ; \quad \bar{I}_4 = j2.5 \text{ Ampère.}$$

Es. 2 Tensione sul carico:

$$\bar{V} = -\frac{11}{13} + j\frac{3}{13} \text{ Volts}$$

$$\bar{P}_{\text{carico}} = \frac{2}{13} - j\frac{1}{13} \text{ (Watt + jVAR).}$$

Es. 3 $I_{\text{libera}}(t) = \frac{9}{25} e^{-\frac{5}{2}t} \text{ Ampère.}$

$$I_{\text{forzata}}(t) = -0.517 e^{-\frac{5}{2}t} + 0.557 \cos(t - 21.8^\circ) \text{ Ampère.}$$

Recupero 2, P.1

Es. 2 $P_{\text{uscita gen. re. costante}} = 12 \text{ Watt}$

$$P_{\text{uscita amplificatore operazionale}} = 342 \text{ Watt}$$

Rechner 2, P2

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Es. 3 $i_L(0^-) = \frac{1}{5} \text{ A}$ bzw. .

$$i_{L, \text{eigen}}(t) = \frac{1}{5} e^{-\frac{33}{5}t}, \quad t > 0$$

$$i_{L, \text{erzwingt}}(t) = -0.451 e^{-\frac{33}{5}t} + 0.496 \cos(3t - 24.4^\circ)$$

$t > 0$, A bzw. .