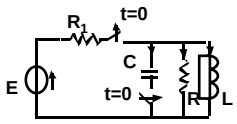
Lezione 38

Esercizi

Esercizi



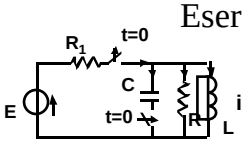
$R = R_2 = 1\Omega$
$L = 4$ mH
$C = 1$ mF
$E = 2$V

Il circuito è a regime per t<0.

Esercizi

Esercizi

$R_1 = R = 1\Omega$
$L = 4$ mH
$C = 1$ mF
$E = 2$V



$i_R = A\,t\,e^{-500\,t} + B\,e^{-500\,t}$

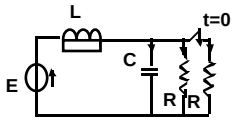
$v_c(0) = 0 \Longrightarrow i_R(0) = 0$

$i_L(0) = \frac{E}{R_1} \Longrightarrow i_C(0) = -\frac{E}{R_1}$ $\qquad i_R = -2\,10^3\,t\,e^{-500\,t}$

$$\left.\frac{d\,i_R}{dt}\right|_{t=0} = \frac{1}{R}\left.\frac{dv_C}{dt}\right|_{t=0} = \frac{-E}{RCR_1}$$

Esercizi

Esercizi

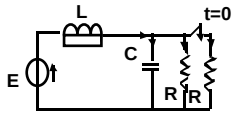


$R = 2\ \Omega$
$L = 2$ mH
$C = 5$ mF
$E = 5$V

Il circuito è a regime per t<0.

Esercizi

Esercizi



$R = 2\ \Omega$
$L = 2$ mH
$C = 5$ mF
$E = 5$V

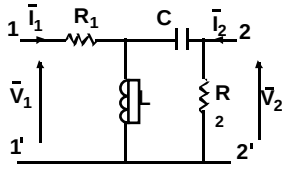
$$i(t) = 5 - 2.5\ e^{-100\,t}\left[\frac{1}{3}\,\mathrm{sen}\,(300\ t) + \cos\,(300\ t)\right]$$

Esercizi

Lezione 39

Esercizi

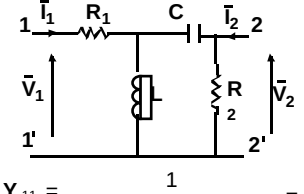
Esercizi



$R_1 = 200\ \Omega$
$R_2 = 100\ \Omega$
$L = 100$ mH
$C = 10\ \mu$F

Determinare i parametri Y del doppio bipolo

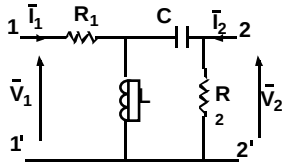
Esercizi



$R_1 = 200\ \Omega$
$R_2 = 100\ \Omega$
$L = 100$ mH
$C = 10\ \mu$F
$\omega = 100$ rad/s

$$Y_{11} = \frac{1}{\frac{-L/C}{j(\omega L - 1/\omega C)} + R_1} = 4.99\ 10^{-3} - j2.52\ 10^{-4}$$

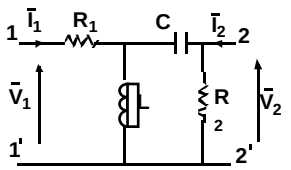
Esercizi



$R_1 = 200\ \Omega$
$R_2 = 100\ \Omega$
$L = 100$ mH
$C = 10\ \mu$F
$\omega = 100$ rad/s

$$Y_{22} = \frac{R_2 + j\left(\frac{R_1 \omega L}{R_1 + j\omega L} - \frac{1}{\omega C}\right)}{j\left(\frac{R_1 \omega L}{R_1 + j\omega L} - \frac{1}{\omega C}\right) R_2} = 1.00\ 10^{-2} + j2.02\ 10^{-3}$$

Esercizi

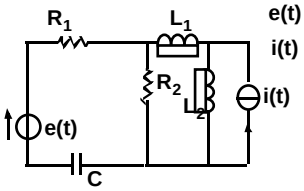


$R_1 = 200\ \Omega$
$R_2 = 100\ \Omega$
$L = 100$ mH
$C = 10\ \mu$F
$\omega = 100$ rad/s

$$Y_{21} = \frac{1}{R_1 + \frac{-L/C}{j(\omega L - 1/\omega C)}} \frac{\omega L}{\omega L - 1/\omega C} =$$

$$= 2.02\ 10^{-4} + j4.99\ 10^{-3}$$

Esercizi



$e(t) = 2\sqrt{2}\ \text{sen}(100\ t)$ V
$i(t) = 3\sqrt{2}\ \text{sen}(100\ t)$ A

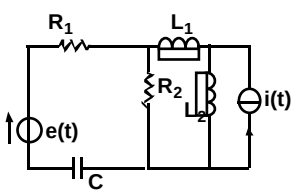
$R_1 = 1\ \Omega$
$R_2 = 2\ \Omega$
$L_1 = 10$ mH
$L_2 = 1$ mH
$C = 1$mF.

$\bar{V}_{R2} = 0.53 + j\ 0.76$

$\bar{I}_{R2} = 0.35 + j\ 0.35$

31.1

Esercizi



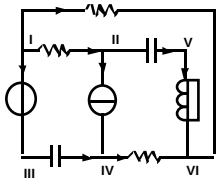
$e(t) = 2\sqrt{2}\ \text{sen}(100\ t)$ V
$i(t) = 3\sqrt{2}\ \text{sen}(100\ t)$ A

$R_1 = 1\ \Omega$
$R_2 = 2\ \Omega$
$L_1 = 10$ mH
$L_2 = 1$ mH
$C = 1$mF.

$v_{R2} = 0.92\sqrt{2}\ \text{sen}(100\ t + 0.962)$

$i_{R1} = 0.50\sqrt{2}\ \text{sen}(100\ t + 0.791)$

Multimetro: un circuito con due generatori



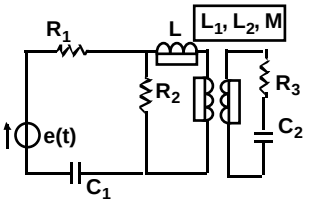
R_{12} = 1,00E+1 Ω; C_{34} = 3,00E-3 F;
C_{25} = 1,00E-3 F; R_{16} = 1,00E+1 Ω;
L_{56} = 1,00E-1 H; R_{46} = 1,00E+1 Ω;
V_{13} = 1,00E+1 V I_{24} = 1,00E+0 A
f = 50 Hz

29.2

Lab

Esercizi

Esercizi



e(t) = 10 √2 sen(314 t)

R_1 = 1 Ω
R_2 = 2 Ω
R_3 = 4 Ω
L = 10 mH
C_1 = 1mF
C_2 = 2mF
L_1 = 9 mH
L_2 = 1 mH
M = 3 mH

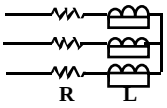
Esercizi

Lezione 40

Esercizi

Terna simmetrica e diretta di tensioni concatenate

V = 380 v



R = 0.1k Ω
L = 100 mH
ω = 314 rad/s

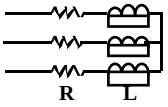
Esercizi

Esercizi

$Z = 100 + j\,31.4 = 104.8\, e^{-j0.30}$

I = 2.1 A P = 1.32 kW

V = 380 v



R = 0.1k Ω
L = 100 mH
ω = 314 rad/s

Esercizi

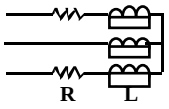
Lezione 41

Esercizi

Esercizi

Terna simmetrica e diretta di tensioni concatenate

V = 380 v



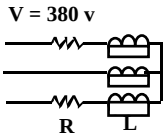
R = 0.1k Ω
L = 100 mH
ω = 314 rad/s

Esercizi

Esercizi

$\bar{V}_{OO'} = -154 - j\,46$ $\quad \bar{E}_1' = 374 + j\,46$ $\quad \bar{I}_1 = 3.54 + j\,0.65$

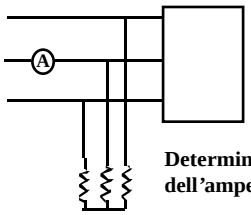
V = 380 v



R = 0.1k W
L = 100 mH
ω = 314 rad/s

Esercizi

Esercizi

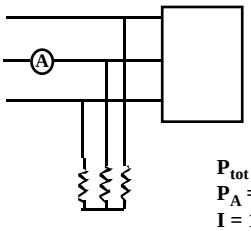


P = √3 kW
Q = 1 kVAr
R = 20 W
V = 380 V

Determinare l'indicazione dell'amperometro

Esercizi

Esercizi

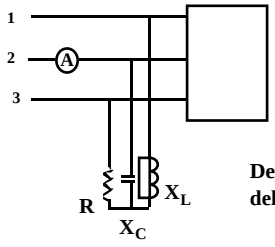


P = √3 kW
Q = 1 kVAr
R = 20 W
V = 380 V

$P_{tot} = 8.99$ kW
$P_A = 9.04$ kW
I = 13.7 A

Esercizi

Esercizi

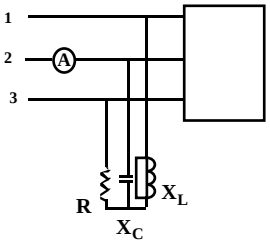


P = 1 kW
Q = 1 kVAr
$V_{23} = 300$ V
$R = X_L = X_C = 40$ W

Determinare l'indicazione dell'amperometro

Esercizi

Esercizi



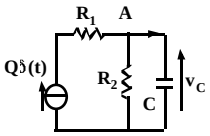
P = 1 kW
Q = 1 kVAr
$\bar{V}_{23} = 300$ V
$R = X_L = X_C = 40$ W

$\bar{V}_{OO'} = 123.8\, e^{-j\pi/6}$

I = 4.73 A

Qualche esempio

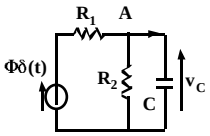
Esercizi



$v(0^+) = v(0^-) + Q/C$

Qualche esempio

Esercizi

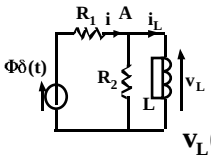


$i(t) = \Phi\, \delta(t)/R_1$

$v(0^+) = v(0^-) + \Phi/R_1C$

Qualche esempio

Esercizi



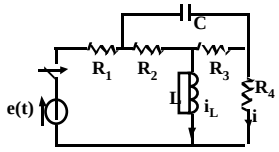
$i(t) = \Phi\, \delta(t)/(R_1 + R_2)$

$v_L(t) = R_2 \Phi\, \delta(t)/(R_1 + R_2)$

$i_L(0^+) = i_L(0^-) + R_2 \Phi/(R_1 + R_2)L$

Un esempio

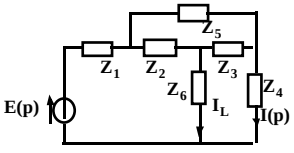
Esercizi



$R_1 = R_4 = 5\ \Omega$;
$R_2 = R_3 = 0.5\ \Omega$;
$L = 1$ H;
$C = 0.5$ F;
$e(t) = 10\,\mathrm{sen}(4t)$.

Un esempio

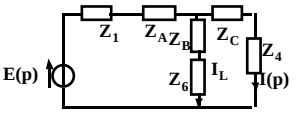
Esercizi



$Z_1 = Z_4 = 5$;
$Z_2 = Z_3 = 0.5$;
$Z_6 = p$;
$Z_5 = 2/p$;
$E(p) = 40/(p^2+16)$

Un esempio

Esercizi

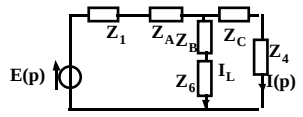


$Z_1 = Z_4 = 5$;
$Z_2 = Z_3 = 0.5$;
$Z_6 = p$;
$Z_5 = 2/p$;
$E(p) = 40/(p^2+16)$

$$Z_A = \frac{1}{p+2} \qquad Z_B = \frac{0{,}25\,p}{p+2} \qquad Z_C = \frac{1}{p+2}$$

Un esempio

Esercizi

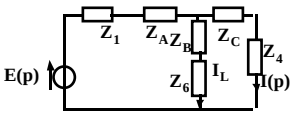


$Z_1 = Z_4 = 5;$
$Z_2 = Z_3 = 0.5;$
$Z_6 = p;$
$Z_5 = 2/p;$
$E(p) = 40/(p^2+16)$

$$I(p) = \frac{Z_B + p}{Z_B + Z_C + 5 + p} \frac{E(p)}{5 + Z_A + \frac{(Z_B + p)(Z_C + 5)}{Z_B + p + Z_C + 5}}$$

Un esempio

Esercizi



$Z_1 = Z_4 = 5;$
$Z_2 = Z_3 = 0.5;$
$Z_6 = p;$
$Z_5 = 2/p;$
$E(p) = 40/(p^2+16)$

$$I(p) = \frac{40}{p^2 + 16} \frac{p + 2{,}25}{5p + 11} \frac{p + 2}{2p^2 + 9{,}5p + 11}$$

Un esempio

Esercizi

$p = -2$
$p = -11/4$

$$2p^2 + 9{,}5p + 11 = 2(p + 2)\left(p + \frac{11}{4}\right)$$

$$I(p) = \frac{40}{p^2 + 16} \frac{p + 2{,}25}{5p + 11} \frac{p + 2}{2p^2 + 9{,}5p + 11}$$

Un esempio

Esercizi

$p = -2$
$p = -11/4$

$$2p^2 + 9{,}5p + 11 = 2(p + 2)\left(p + \frac{11}{4}\right)$$

$$I(p) = \frac{4}{p^2 + 16} \frac{p + 2{,}25}{p + \frac{11}{5}} \frac{1}{p + \frac{11}{4}}$$

Un esempio

Esercizi

$p = -2$
$p = -11/4$

$$2p^2 + 9{,}5p + 11 = 2(p + 2)\left(p + \frac{11}{4}\right)$$

$$I(p) = \frac{A\,p + B}{p^2 + 16} + \frac{C}{p + \frac{11}{5}} + \frac{D}{p + \frac{11}{4}}$$

Un esempio

Esercizi

$e^{-\alpha t} \Rightarrow \frac{1}{p+\alpha}$

$\cos\beta t \Rightarrow \frac{p}{p^2+\beta^2}$

$\sin\beta t \Rightarrow \frac{\beta}{p^2+\beta^2}$

$$I(p) = \frac{A\,p + B}{p^2 + 16} + \frac{C}{p + \frac{11}{5}} + \frac{D}{p + \frac{11}{4}}$$

Un esempio

Esercizi

$$e^{-\alpha t} \Longrightarrow \frac{1}{p+\alpha} \qquad \cos\beta t \Longrightarrow \frac{p}{p^2+\beta^2} \qquad \sin\beta t \Longrightarrow \frac{\beta}{p^2+\beta^2}$$

$$i(t) = \mathcal{L}^{-1}\{I_1(p) + I_2(p)\} = A\cos 4t + \frac{B}{4}\sin 4t + Ce^{-(11/5)t} + (D-1)e^{-(11/4)t}$$