DEFINIZIONE FUNZIONI

$j := 1\mathrm{i}$ $\quad fase(x) := \mathrm{angle}(\mathrm{Re}(x), \mathrm{Im}(x))$ $\quad eff(x) := \dfrac{|x|}{\sqrt{2}}$

DATI

$\omega := 2.5 \cdot 10^9 \ \dfrac{rad}{s}$ $\quad T := \dfrac{2 \cdot \pi}{\omega} = 2.513 \ ns$ $\quad V := 6 \ V \angle 65 \ °$

$R := 1.5 \ k\Omega$ $\quad V_M := |V| = 6 \ V$ $\quad \alpha_v := fase(V) = 65 \ °$

$L := 0.42 \ \mu H$ $\quad V = (2.536 + 5.438\mathrm{i}) \ V$

CALCOLO Z e i(t)

$v(t) := V_M \sin(\omega \cdot t + \alpha_v)$

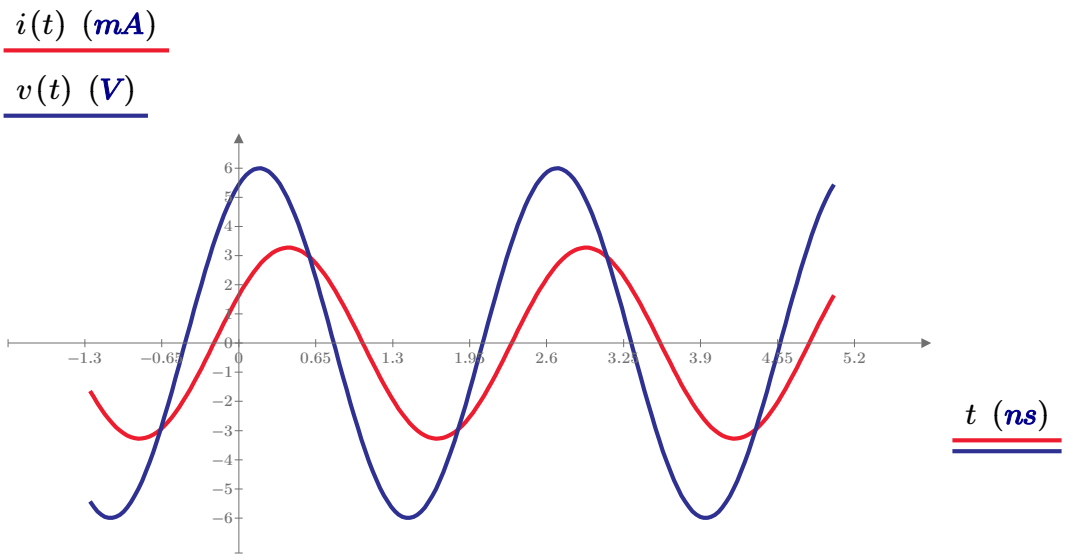
$Zs := R + j \cdot \omega \cdot L = (1.5 \cdot 10^3 + 1.05\mathrm{i} \cdot 10^3) \ \Omega$ $\quad |Zs| = (1.831 \cdot 10^3) \ \Omega$

$\varphi := fase(Zs) = 34.992 \ °$

$I := \dfrac{V}{Zs} = (0.003 + 0.002\mathrm{i}) \ A$ $\quad I_M := |I| = 3.277 \ mA$ $\quad \alpha_i := fase(I) = 30.008 \ deg$

$i(t) := I_M \sin(\omega \cdot t + \alpha_i)$

GRAFICI CORRENTE E TESIONE (prima del rifasamento)



CAPACITA' DI RIFASAMENTO

$C := \frac{L}{|Zs|^2} = (1.253 \cdot 10^{-13})\ \boldsymbol{F}$ $\quad Xc := \frac{1}{j \cdot \omega \cdot C} = -3.193\mathrm{i} \cdot 10^{3}\ \boldsymbol{\Omega}$

$Zp := \frac{Zs \cdot Xc}{Zs + Xc} = (2.235 \cdot 10^{3} + 2.042\mathrm{i} \cdot 10^{-13})\ \boldsymbol{\Omega}$ $\quad fase(Zp) = 9.136 \cdot 10^{-17}$

la fase di Zp è piccolissima ($\cong 0$)

POTENZA

$V_E := eff(V) = 4.243\ \boldsymbol{V}$ $\qquad I_E := eff(I) = 0.002\ \boldsymbol{A}$

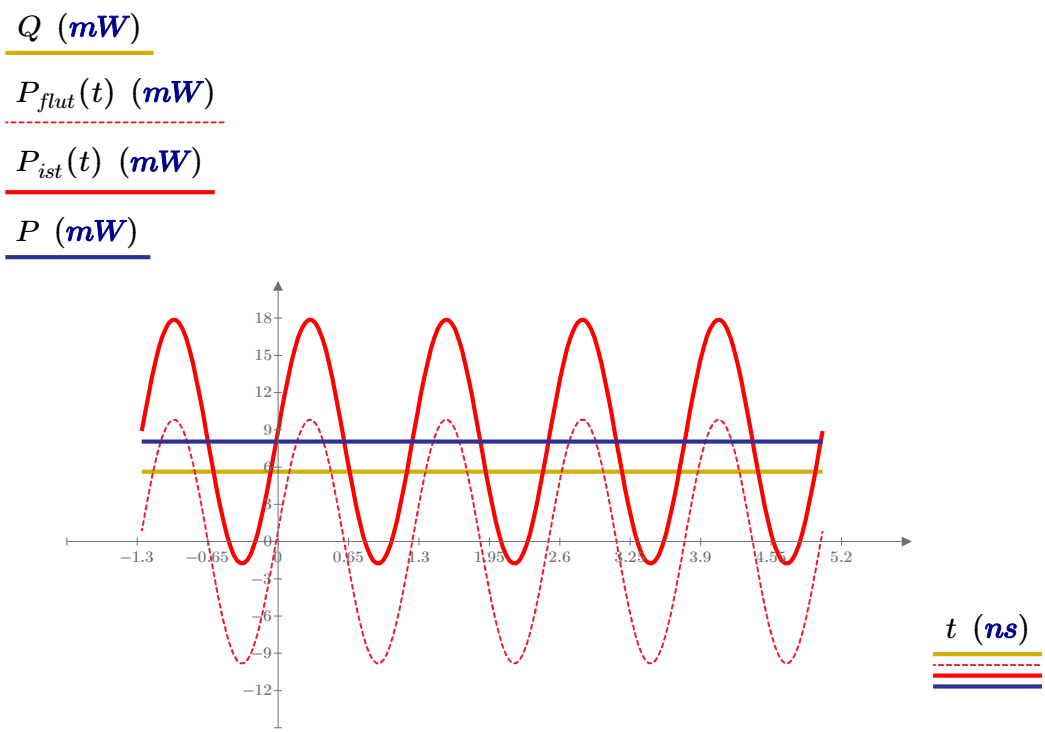
$P_{ist}(t) := V_E \cdot I_E \cdot \cos(\varphi) - V_E \cdot I_E \cdot \cos(2\ \omega \cdot t + \alpha_v + \alpha_i)$ POTENZA ISTANTANEA

$P_{flut}(t) := -V_E \cdot I_E\ \cos(2 \cdot \omega \cdot t + \alpha_v + \alpha_i)$ POTENZA FLUTTUANTE

$P := V_E \cdot I_E \cdot \cos(\varphi) = 8.054\ \boldsymbol{mW}$ POTENZA ATTIVA

$Q := V_E \cdot I_E \cdot \sin(\varphi) = 5.638\ \boldsymbol{mW}$ [VAR] POTENZA REATTIVA

GRAFICI POTENZE



$$P_x := \begin{bmatrix} \mathrm{Im}(P) \\ P \end{bmatrix} = \begin{bmatrix} 0 \\ 8.054 \end{bmatrix} \ mW \qquad P_y := \begin{bmatrix} \mathrm{Im}(P) \\ \mathrm{Im}(P) \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \end{bmatrix} \ mW$$

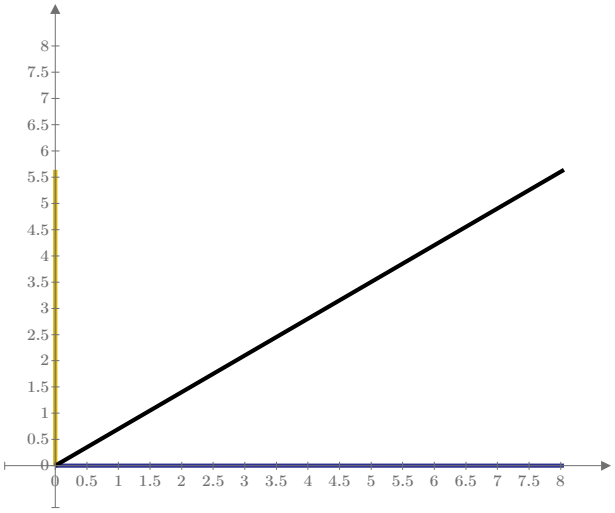
$$Q_x := \begin{bmatrix} \mathrm{Im}(P) \\ \mathrm{Im}(P) \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \end{bmatrix} \ mW \qquad Q_y := \begin{bmatrix} \mathrm{Im}(Q) \\ Q \end{bmatrix} = \begin{bmatrix} 0 \\ 5.638 \end{bmatrix} \ mW$$

$$P_x + Q_x = \begin{bmatrix} 0 \\ 8.054 \end{bmatrix} \ mW \qquad P_y + Q_y = \begin{bmatrix} 0 \\ 5.638 \end{bmatrix} \ mW$$

$P_y \ (mW)$

$Q_y \ (mW)$

$P_y + Q_y \ (mW)$



$P_x \ (mW)$

$Q_x \ (mW)$

$P_x + Q_x \ (mW)$