t_6; $V = 0V$ $P = 0w$

(6)

$P = \frac{E}{t}$ $[E]$ = Joules
$[t]$ = segundos
$[P]$ = WATTS

unidades de potencia
VA
W
VAR

$P = v_{(t)} \; i_{(t)}$
↳ Potencia instantanea

$v_{(t)} = V_m \cdot \text{sen}(\omega t + \varphi_v)$
$I_{(t)} = I_m \cdot \text{sen}(\omega t + \varphi_I)$

$P = V_m \cdot \text{sen}(\omega t + \varphi_v) \cdot I_m \cdot \text{sen}(\omega t)$
$P = V_m \cdot I_m \cdot \cos(\varphi_v)(1 - \cos(2\omega t)) + VI \cdot \text{sen}(\varphi_v) \cdot \text{sen}(2\omega t)$

$P = \underbrace{V_{rms} \cdot I_{rms} \cdot \cos(\varphi_v)}_{A} - \underbrace{V_{rms} I_{rms} \cos\varphi_v \cdot \cos(2\omega t)}_{1} + \underbrace{VI \cdot \text{sen}(\varphi_v) \cdot \text{sen}(2\omega t)}_{2}$

NOTA

Escaneado con CamScanner

HOJA Nº

FECHA

A es una constante.

① es senoidal
② es cosenoidal

A es la Potencia media (Promedio)

$\cos(\varphi_z)$ = Factor de Potencia. (PF)

Resistor

$P = V.I.(1 - \cos(2\omega t))$

Potencia en inductor

$\varphi_v = 90°$

$P = VI.\text{sen}(2\omega t)$ "el inductor no disipa energía"

$E = LI^2$ (Joules)

$E = L\frac{(I_{rms})^2}{2}$

Potencia reactiva = $P_Q = VI.\text{sen}\,\varphi$ $[P_Q]$ = VAR volt-Amper reactivo

$P_Q = \frac{V^2}{X_L} = I^2.X_L$

Potencia capacitor

$\varphi_v = -90°$

$P = -VI\,\text{sen}(2\omega t)$ "el capacitor no disipa energía"

$P_Q = \frac{V^2}{X_C} = I^2.X_C$

$E = C.V_m^2 = C.\frac{V_{rms}^2}{2}$

S es	Potencia	aparente	VA
Q es	Potencia	reactiva	VAR
P es	Potencia	activa	W

NOTA

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$|P_S| = V_{rms}\ I_{rms}$

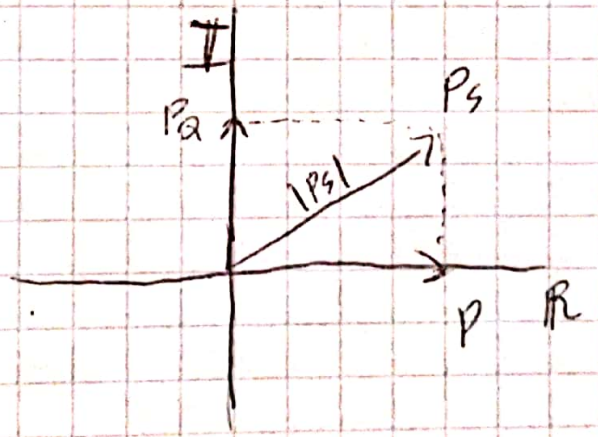
$\varphi_V - \varphi_I = \varphi_z$

$P_S = \underbrace{V\ I^*}_{\text{fasores}}$ (conjugado) $= V_{rms} e^{j\varphi_V} \cdot I_{rms} e^{-j\varphi_I} =$

$= \underbrace{V_{rms} \cdot I_{rms}}_{|P_S|} e^{j\overbrace{(\varphi_V - \varphi_I)}^{\varphi_z}}$

$P_S = \overbrace{V_{rms}\ I_{rms} \cdot \cos(\varphi_z)}^{P} + j\overbrace{V_{rms}\ I_{rms} \cdot \operatorname{sen}(\varphi_z)}^{Q}$

$|P_S| = \sqrt{P^2 + Q^2}$



$P_F \bullet FP = \frac{P}{|P_S|} = \frac{V_{rms} \cdot I_{rms} \cdot \cos\varphi}{V_{rms} \cdot I_{rms}} = \cos\varphi$ { adelanto capacitor; atraso inductor

factor de potencia.

$$i_C(t) = C \frac{d\,V_C(t)}{d\,t}$$

fasorial

$$I_C = C \cdot V_C \cdot j\omega \Rightarrow Z_C = \frac{V_C}{I_C} = \frac{1}{j\omega C}$$

Ahora depende de la frecuencia, cambio el dominio, se mira con un analizador de espectro.

NOTA

Escaneado con CamScanner

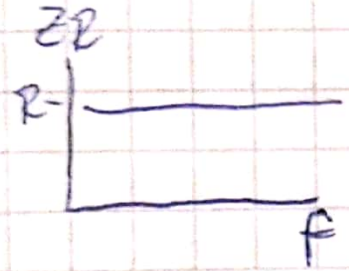
Filtros (ideales)

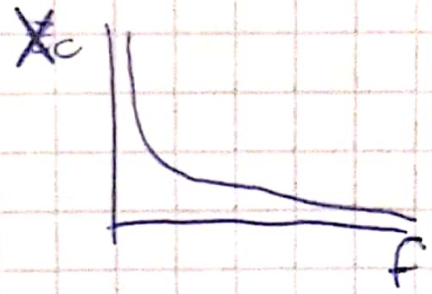
- Pasa bajo
- Pasa alto
- Pasa banda
- elimina banda.

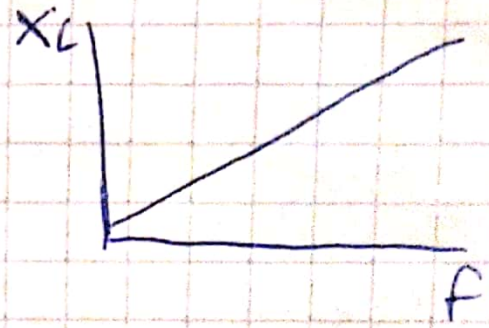
$Z_R = R$

$Z_C = \frac{-j}{\omega C}$

$Z_L = j\omega L$

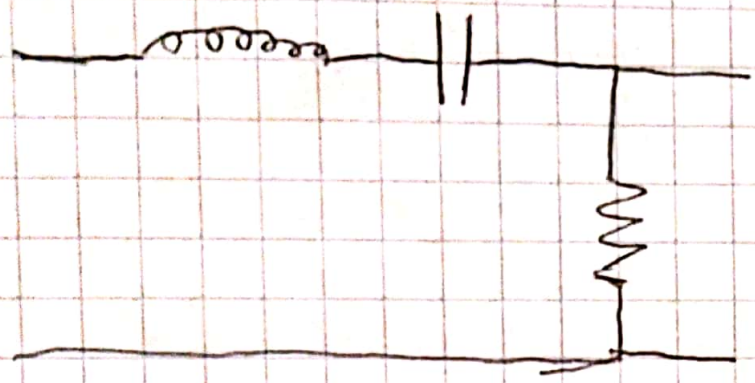




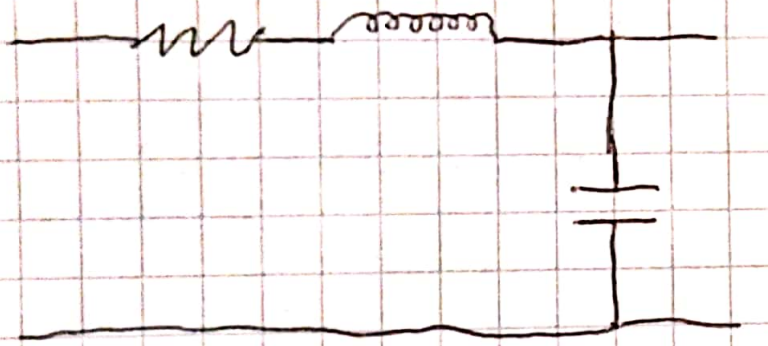


Escaneado con CamScanner

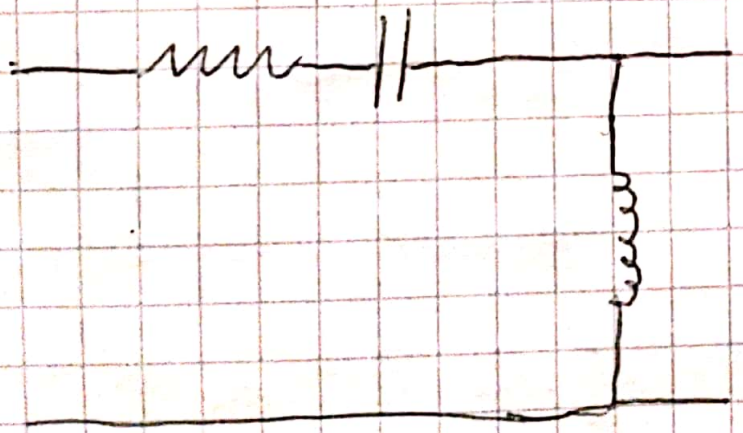
frecuencia



Filtro Pasa banda



filtro Pasa bajo



filtro Pasa alto

Escaneado con CamScanner

1200 VA

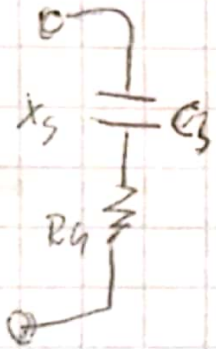
$$\frac{1200\,VA}{200\,V} = \boxed{6A}$$

Ed

Factor de calidad

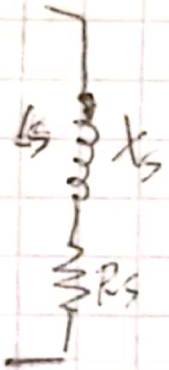
$$\frac{1}{D} = Q = \frac{|\text{Potencia reactiva}|}{\text{Potencia activa}}$$

↳ Factor de Disipación



$$\boxed{Q = \frac{I^2 \cdot X_S}{I^2 \cdot R_S} = \frac{X_S}{R_S}}$$

$$\boxed{Q_{S\,cap} = \frac{1}{\omega C_S R_S}}$$



$$\boxed{Q_{S\,ind} = \frac{\omega L_S}{R_S}}$$

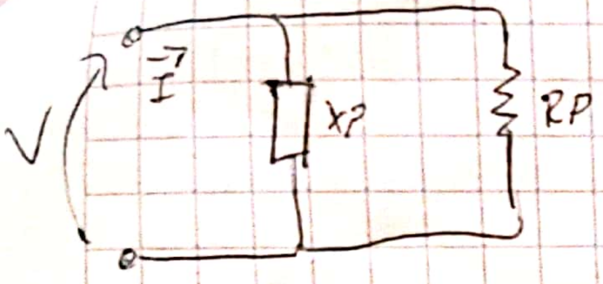
NOTA

Escaneado con CamScanner

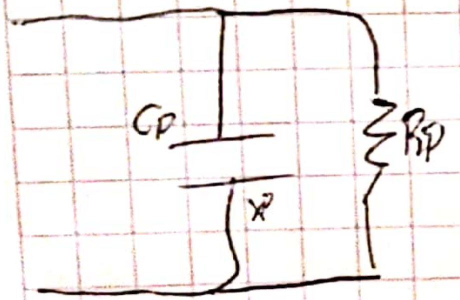
200V

HOJA N°

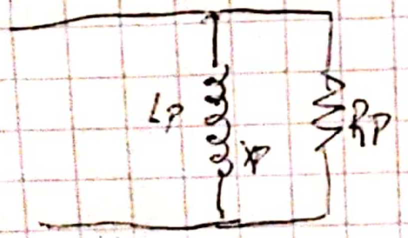
FECHA



$$Q_P = \frac{|P_q|}{P} = \frac{\frac{V^2}{X_P}}{\frac{V^2}{R_P}} = \frac{\frac{1}{X_P}}{\frac{1}{R_P}} = \frac{1}{X_P} : \frac{1}{R_P} = \frac{1}{X_P} \cdot R_P = \frac{R_P}{X_P}$$



$$Q_{P\,cap} = \frac{R_P}{\frac{1}{\omega C_P}} = R_P \cdot \omega C_P$$

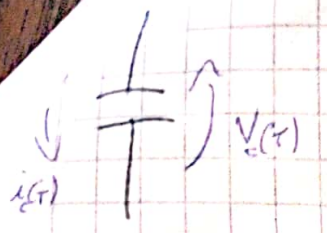


$$Q_{P\,ind} = \frac{R_P}{\omega L_P}$$

(P) ② 200W + 200W + 0W + 50W = |350W = Pt|

HOJA Nº

FECHA



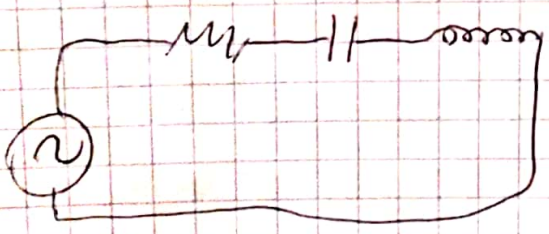
$$i_c(\tau) = C \cdot \frac{d v_c(\tau)}{d\tau}$$

$$\int \frac{1}{C} \cdot i_c(\tau) \cdot d\tau = \int d v_c(\tau)$$

$$v_c(\tau) = \frac{1}{C} \int i_c(\tau)\, d\tau$$

$$v_L(\tau) = L \cdot \frac{d i_L(\tau)}{d\tau}$$

$$i_L(\tau) = \frac{1}{L} \int v_L(\tau)\, d\tau$$



$$v(\tau) = v_R + v_c + v_L$$

$$v = iR + \frac{1}{C}\int i_c\, d\tau + L \cdot \frac{di}{d\tau}$$

↓ laPlace

$$s = \sigma + j\omega$$

$$V(s) = I_{(s)} R + \frac{I}{C} \cdot \frac{I_{(s)}}{s} + L \cdot I_{(s)} \cdot s$$

$$V(s) = I_{(s)} \cdot \left(R + \frac{1}{sC} + sL\right)$$

Escaneado con CamScanner