Apuntes de C.A.

$e = E_0 \text{ Sen } (\omega t \pm \varphi)$

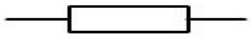
Siendo: La fase $(\omega t \pm \varphi)$; el desfase φ

ω : Pulsación, frecuencia angular, velocidad angular.

$\omega = \frac{2\Pi}{T}$; $T = \frac{1}{f}$; $\omega = 2\Pi$

e =Tensión instantánea y E_0 = Tensión máxima

Impedancias



Z = R

C $X_c = \frac{-1}{C\omega} \rightarrow X_c = \frac{-1}{c\omega} j$ Capacitancia = - X_c

L $X_l = L \cdot w \rightarrow X_l = L \cdot w\, j$ Inductancia = X_l

Impedancia total : $Z = \sqrt{R^2 + (X_l - X_c)^2}$

Reactancia total : $X = (X_l - X_c)$

Susceptancia : $b = \frac{X}{Z^2}$

Conductancia : $g = \frac{R}{Z^2}$

Admitancia : $Y = \frac{1}{Z} \rightarrow Y = \sqrt{g^2 + b^2}$

$i = I_0 \text{ Sen } (\omega t \pm \varphi)$

i =Intensidad instantánea y I_0 = Intensidad máxima

$i = \frac{e}{Z}$; $I_0 = \frac{E_0}{Z}$; $E_{ef} = \frac{E_0}{\sqrt{2}}$; $I_{ef} = \frac{I_0}{\sqrt{2}}$; $I_{ef} = \frac{E_{ef}}{Z}$; $I_{ef} = Irms$; $E_{ef} = Erms$

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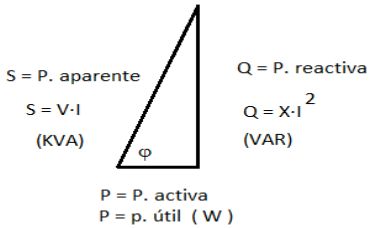
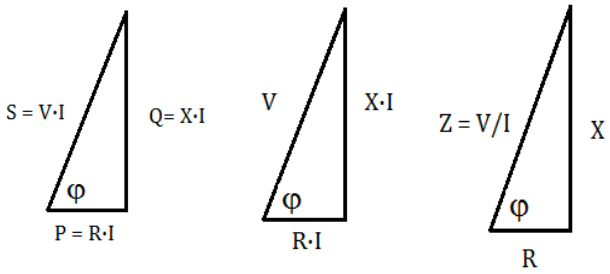
Potencias



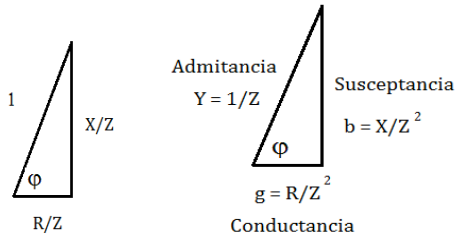
S = V·I
P = V·I·Cos φ
Q = V·I·Sen φ
Factor de potencia = Cos φ
φ = arc.tang X/R

Potencias Tensiones Impedancias

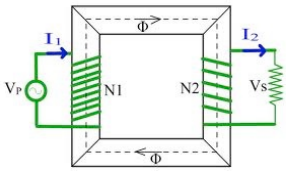


$$V = \sqrt{V_R^2 + (V_l - V_c)^2} \qquad Z = \sqrt{R^2 + (X_l - X_c)^2}$$

Si dividimos por Z, tendremos:



Transformador



$P_p = P_s$; $\frac{V_p}{V_s} = \frac{N_p}{N_s}$; $\frac{I_p}{I_s} = \frac{N_p}{N_s}$; $\frac{Z_p}{Z_s} = (\frac{N_p}{N_s})^2$

Resonancia

$X_l = X_c \rightarrow L\omega = \frac{1}{c\omega} \rightarrow \omega^2 = \frac{1}{Lc} \rightarrow (2\pi f)^2 = \frac{1}{Lc} \rightarrow f = \frac{1}{\sqrt{2\pi\sqrt{Lc}}}$

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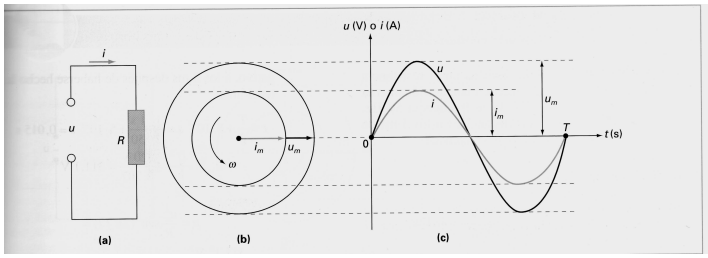
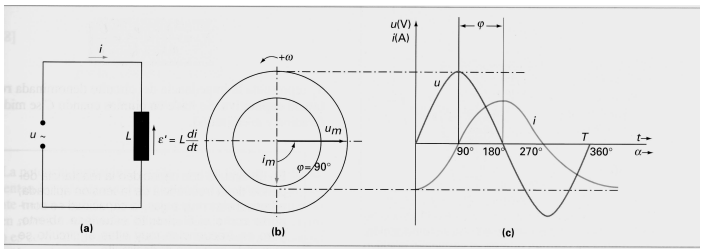
Circuito R



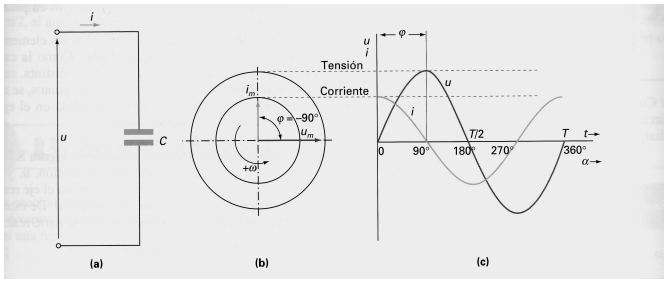
$u = U_0 \operatorname{sen} \omega t$; $i = I_0 \operatorname{Sen}(\omega t)$

Circuito L



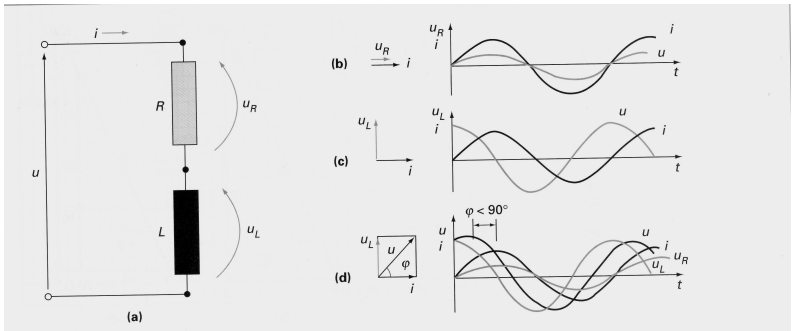
$u = U_0 \operatorname{sen} \omega t$; $i = I_0 \operatorname{Sen}(\omega t - \frac{\pi}{2})$

Circuito C



$u = U_0 \operatorname{sen} \omega t$; $i = I_0 \operatorname{Sen}(\omega t + \frac{\pi}{2})$

Circuito RL



$u = U_0 \operatorname{sen} \omega t$; $i = I_0 \operatorname{Sen}(\omega t - \frac{\pi}{2})$; $V_R = R \cdot I$; $V_L = X_L \cdot I$;

$\vec{V}_T = \vec{V}_R + \vec{V}_L$; $\varphi = arc.\tan g \, X/R$

Circuito RC

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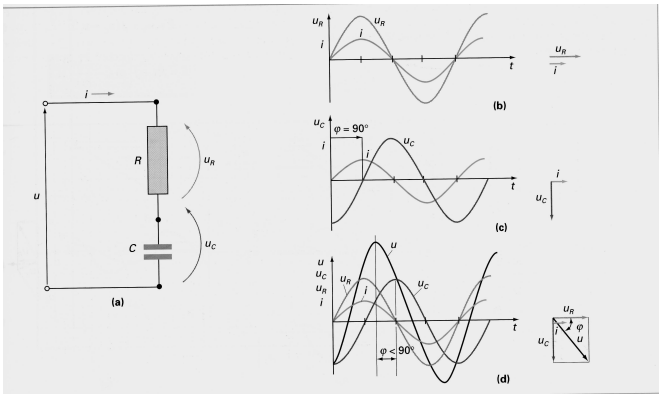
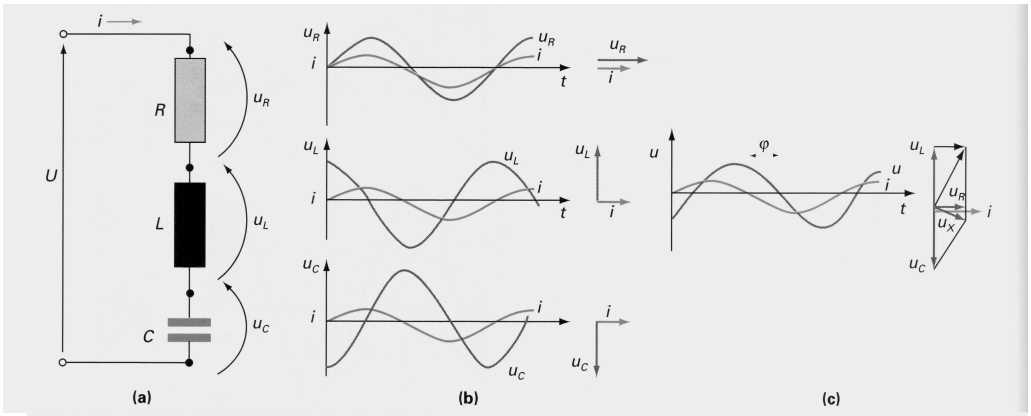
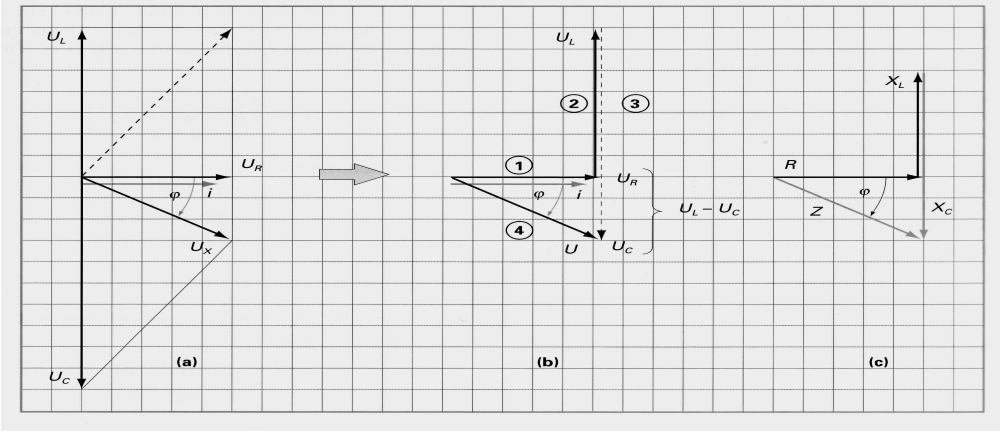


$u = U_0 \operatorname{sen} \omega t$; $i = I_0 \operatorname{Sen}(\omega t + \frac{\pi}{2})$;

$V_R = R \cdot I$; $V_c = X_c \cdot I$; $\vec{V}_T = \vec{V}_R + \vec{V}_c$; $\varphi = arc.\tan g \, X/R$

Circuito RLC





Circuito Paralelo RC

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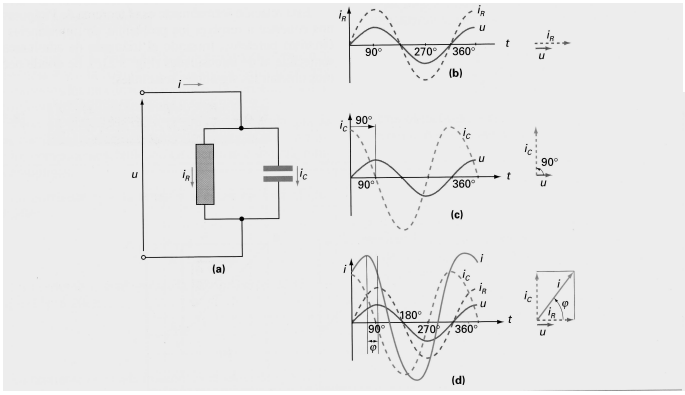
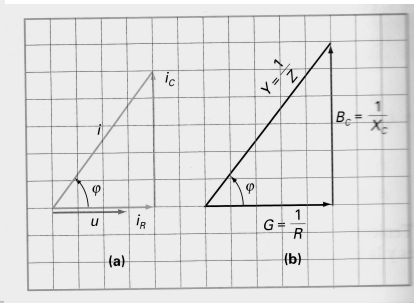
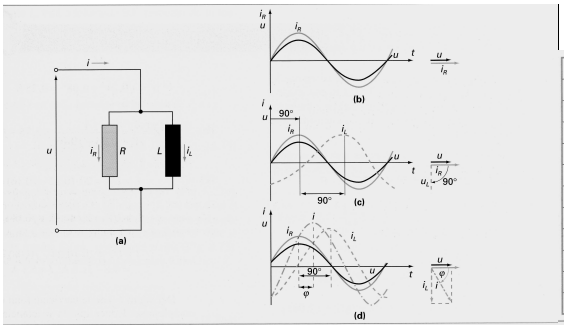
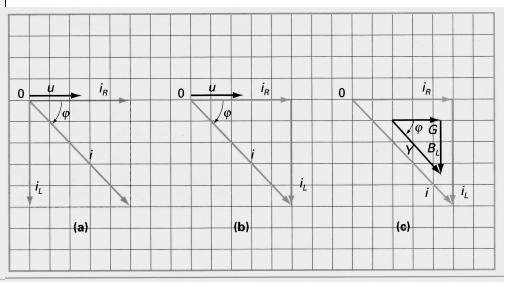




Circuito Paralelo RL





Circuito Paralelo RLC

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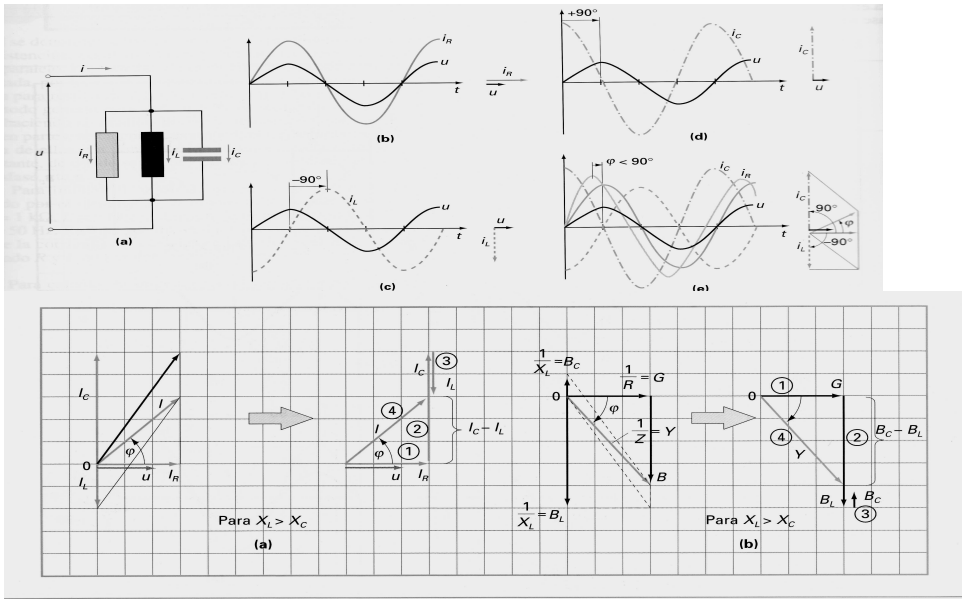

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