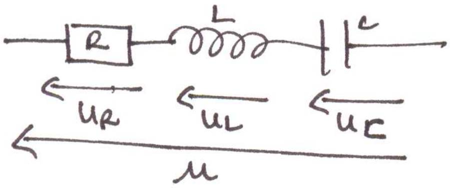
Premiere STI (14)

Régimes sinusoïdaux - circuit RLC série

Circuit RLC Série : $i(t) = I\sqrt{2}\cos\omega t$

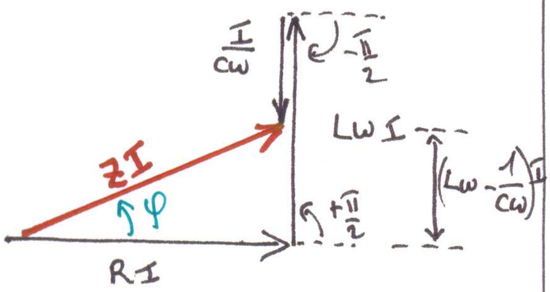
$u(t) = U\sqrt{2}\cos(\omega t + \varphi)$



Fresnel

$$\vec{U} = \vec{U_R} + \vec{U_L} + \vec{U_C}$$

$$\vec{U}\begin{cases} ZI \\ \varphi \end{cases} \quad \vec{U_R}\begin{cases} RI \\ 0 \end{cases} \quad \vec{U_L}\begin{cases} L\omega I \\ +\frac{\pi}{2} \end{cases} \quad \vec{U_C}\begin{cases} \frac{I}{C\omega} \\ -\frac{\pi}{2} \end{cases}$$



$$\boxed{Z = \sqrt{R^2 + \left(L\omega - \frac{1}{C\omega}\right)^2}}$$

$$\boxed{\tan\varphi = \frac{L\omega - \frac{1}{C\omega}}{R}}$$

nombres complexes

$$\underline{U} = \underline{U_R} + \underline{U_L} + \underline{U_C}$$

$$\underline{U} = \underline{Z}\,\underline{I} \quad \underline{U_R} = R\underline{I} \quad \underline{U_L} = jL\omega\underline{I}$$

$$\underline{U_C} = -j\frac{\underline{I}}{C\omega}$$

ou $\underline{Z_R} = R$ $\underline{Z_L} = jL\omega$ et $\underline{Z_C} = -j\frac{1}{C\omega}$

$$\underline{U} = \underline{Z_R}\,\underline{I} + \underline{Z_L}\,\underline{I} + \underline{Z_C}\,\underline{I}$$

$$\underline{U} = (\underline{Z_R} + \underline{Z_L} + \underline{Z_C})\,\underline{I}$$

$$\underline{U} = \underbrace{\left[R + j\left(L\omega - \frac{1}{C\omega}\right)\right]}_{\text{impédance complexe}}\underline{I}$$

$$\boxed{\underline{Z} = R + j\left(L\omega - \frac{1}{C\omega}\right)}$$

module $\underline{Z} = Z = \sqrt{R^2 + \left(L\omega - \frac{1}{C\omega}\right)^2}$

$\arg\underline{Z} = \tan^{-1}\left(\frac{L\omega - \frac{1}{C\omega}}{R}\right) = \varphi$

dephasage de u % i