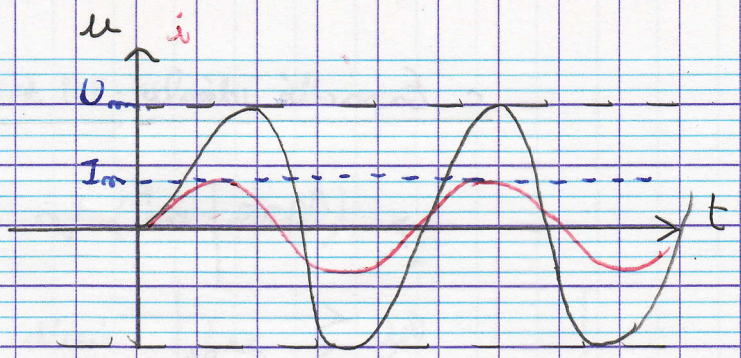
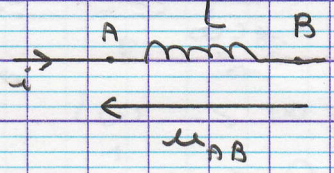
$\arg(R) = 0$

$\Downarrow$

u et i sont en phase



b. Bobine idéale

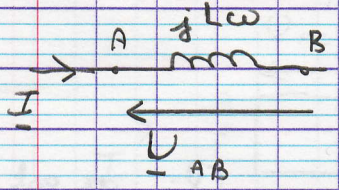


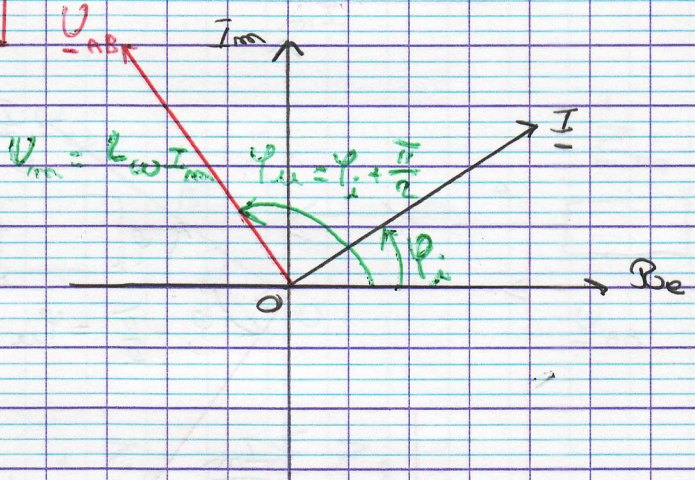
$$u_{AB} = L \cdot \frac{di}{dt}$$

$$\underline{u}_{AB} = L \cdot j\omega \cdot \underline{i}$$

$$\underline{U}_{AB} = \underbrace{jL\omega}_{Z_L} \cdot \underline{I}$$

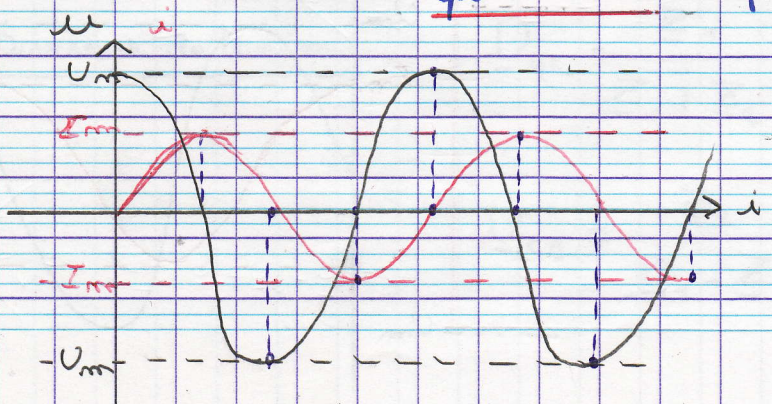
d'où $\boxed{\underline{Z}_L = jL\omega}$



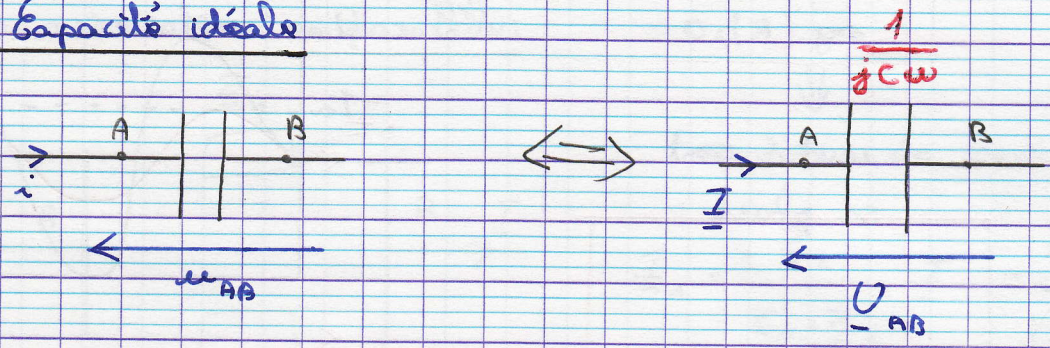


↳ Cl: u est en avance de phase de $+\frac{\pi}{2}$ par rapport à i

u est en quadrature de phase p/r à i.



c- Capacité idéale



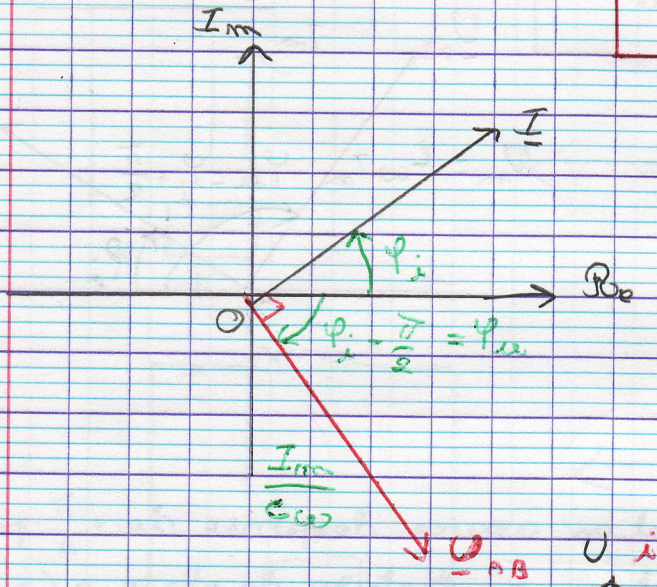
$$\forall t \quad i = \frac{dq}{dt} = C\frac{du_{AB}}{dt} \rightarrow \underline{i} = C\,j\omega\,\underline{u}_{AB}$$

$$\underline{u}_{AB} = \frac{1}{jC\omega}\,\underline{i} \qquad \boxed{\underline{U}_{AB} = \frac{1}{jC\omega}\,\underline{I} = \underline{Z}_C\,\underline{I}}$$

$$\underline{U}_{AB} = \frac{I_m}{C\omega}\, e^{j\varphi_i}\, e^{-j\frac{\pi}{2}}$$

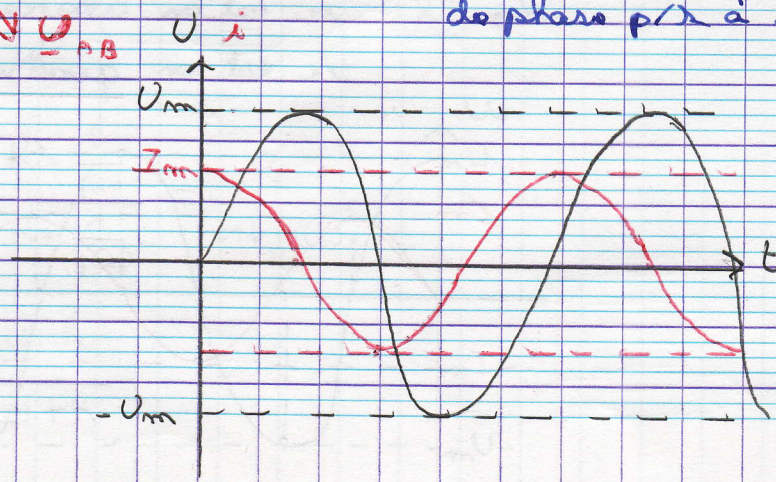
$$= U_m\, e^{j\varphi_u}$$

$$\boxed{U_m = \frac{I_m}{C\omega} \qquad \varphi_u = \varphi_i - \frac{\pi}{2}}$$



Cl: u est en retard de phase de $\frac{\pi}{2}$ p/r à i

ou/ en quadrature retard de phase p/r à i.



d- Comportement à BF et HF:

régime continu: $(\omega = 0)$ / $(\omega = 2\pi f)$

$R \rightarrow R$

$L\omega \rightarrow 0$

$\frac{1}{C\omega} \rightarrow \infty$

d'où

$L \leftrightarrow$	fil
$C \leftrightarrow$	K ouvert

à haute fréquence:

$R \rightarrow R$

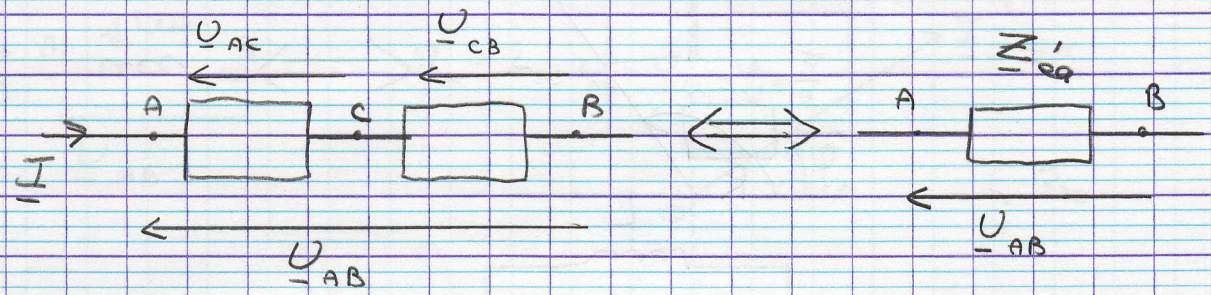
$L\omega \rightarrow \infty$

$\frac{1}{C\omega} \rightarrow 0$

$L \leftrightarrow$	K ouvert
$C \leftrightarrow$	fil

2) Associations de dipôles:

a- association série



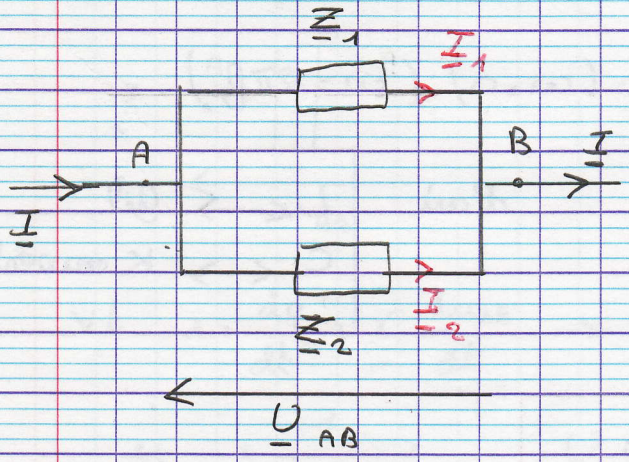
$$\underline{Z}_{éq} = \underline{Z}_1 + \underline{Z}_2 = \sum_k \underline{Z}_k$$

Diviseur de tension:

$$\underline{U}_{AC} = \frac{\underline{Z}_1}{\underline{Z}_1 + \underline{Z}_2} \cdot \underline{U}_{AB}$$

$$\underline{U}_{CB} = \frac{\underline{Z}_2}{\underline{Z}_1 + \underline{Z}_2} \underline{U}_{AB}$$

b. association en parallèle:



Diviseur de courant:

$$\underline{I}_1 = \frac{\underline{Z}_2}{\underline{Z}_1 + \underline{Z}_2}\,\underline{I} = \frac{\underline{Y}_1}{\underline{Y}_1 + \underline{Y}_2}\,\underline{I}$$

$$\underline{I}_2 = \frac{\underline{Z}_1}{\underline{Z}_1 + \underline{Z}_2}\,\underline{I} = \frac{\underline{Y}_2}{\underline{Y}_1 + \underline{Y}_2}\,\underline{I}$$

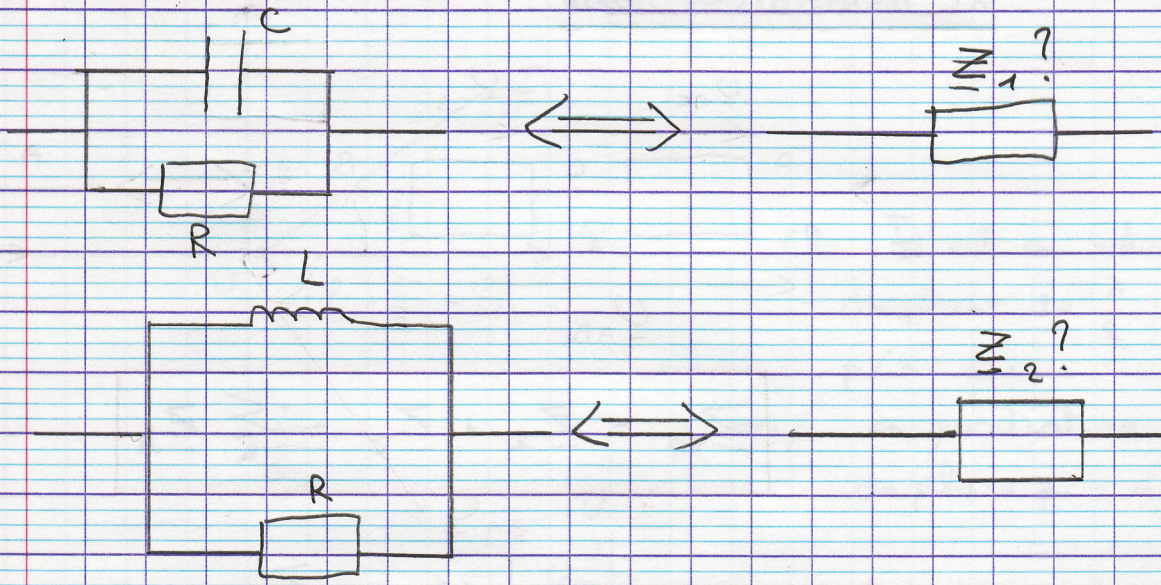
$$\underline{Y}_{éq} = \underline{Y}_1 + \underline{Y}_2$$

$$\frac{1}{\underline{Z}_{éq}} = \frac{1}{\underline{Z}_1} + \frac{1}{\underline{Z}_2} = \sum_k \frac{1}{\underline{Z}_k}$$

cas où $\underline{Z}_1 // \underline{Z}_2$:

$$\underline{Z}_{éq} = \frac{\underline{Z}_1 \cdot \underline{Z}_2}{\underline{Z}_1 + \underline{Z}_2}$$

c. Exercice



$$\underline{Z}_1 = R // \frac{1}{jC\omega} = \frac{R \cdot \frac{1}{jC\omega}}{R + \frac{1}{jC\omega}} = \frac{R}{1 + jRC\omega}$$

$$\underline{Z}_2 = jL\omega // R = \frac{jL\omega \cdot R}{jL\omega + R}$$