

Correction série 1 - Impédances

Exercice 1:

$$a) \quad Z_c = \frac{1}{C \cdot \omega} = \frac{1}{(25 \times 10^{-6}) \times 628} = 63,7 \, \Omega$$

$$\omega = 2\pi \times f = 2\pi \times 100 = 628 \text{ rad.s}^{-1}$$

$$b) \quad \underline{Z}_c = \left[63,7 ; -\frac{\pi}{2} \right] = -j 63,7$$

$$c) \quad \underline{I} = \frac{U}{\underline{Z}_c} \quad \text{avec } U = \frac{U_{\max}}{\sqrt{2}} = \frac{141,4}{\sqrt{2}} = 100 \text{ V}$$

$$\underline{I} = \frac{100}{63,7} = 1,57 \text{ A}$$

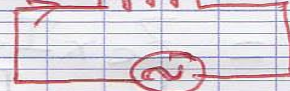
$$d) \quad \underline{I} = \frac{U}{\underline{Z}_c} = \frac{\left[100 ; 0 \right]}{\left[63,7 ; -\frac{\pi}{2} \right]} = \left[\frac{100}{63,7} ; 0 - \left(-\frac{\pi}{2} \right) \right]$$

$$\text{donc } \underline{I} = \left[1,57 ; +\frac{\pi}{2} \right] = +j 1,57$$

$$e) \quad i(t) = 1,57\sqrt{2} \sin(628t + \frac{\pi}{2})$$

Exercice 2

$$L = 0,1375 \text{ H}$$



$$u(t) = 120\sqrt{2} \sin \omega t$$

$$a) \quad Z_L = L \times \omega \quad \text{avec } \omega = 2\pi \times f = 2\pi \times 75$$

$$\omega = 471 \text{ rad.s}^{-1}$$

$$Z_L = 0,1375 \times 471 = 176,625 \, \Omega$$

$$b) \quad \underline{Z}_L = jL\omega = j176,6 = \left[176,6 ; +\frac{\pi}{2} \right]$$

$$c) \quad \underline{I} = \frac{U}{\underline{Z}_L} = \frac{120}{176,6} = 0,68 \text{ A}$$

$$d) \quad \underline{I} = \frac{U}{\underline{Z}_L} = \frac{\left[120 ; 0 \right]}{\left[176,6 ; +\frac{\pi}{2} \right]}$$

$$\underline{I} = \left[\frac{120}{176,6} ; 0 - \frac{\pi}{2} \right] = \left[0,68 ; -\frac{\pi}{2} \right]$$

$$e) \quad i(t) = 0,68\sqrt{2} \sin(471t - \frac{\pi}{2})$$