1ère STI. **devoir n°8 : grandeurs sinusoïdales et dipôles linéaires – Correction**

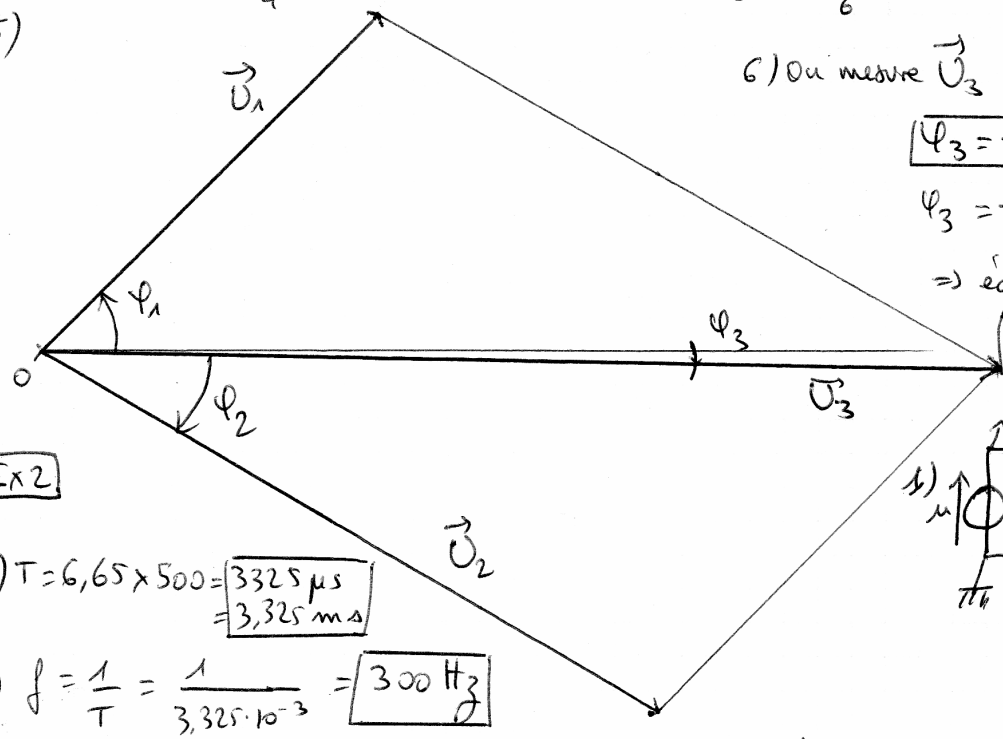
Ex1 1) $\omega = \frac{2\pi}{T} \Rightarrow T = \frac{2\pi}{\omega} = \frac{2\pi}{314} = \boxed{0,02\ s = 20\ ms}$

2) $\boxed{\varphi_1 = \frac{\pi}{4}\ rad}$; $\boxed{\varphi_2 = -\frac{\pi}{6}\ rad}$

3) φ : déphasage de u_1 par rapport à u_2 : $\varphi = \varphi_2 - \varphi_1 = -\frac{\pi}{6} - \frac{\pi}{4} = \boxed{\frac{-5\pi}{12}\ rad = -75°}$

4) $\vec{U}_1 \begin{cases} U_1 = 14,1\ V \leftrightarrow 7,05\ cm \\ \varphi_1 = \frac{\pi}{4}\ rad = 45° \end{cases}$ $\vec{U}_2 \begin{cases} U_2 = 21,2\ V \leftrightarrow 10,6\ cm \\ \varphi_2 = -\frac{\pi}{6}\ rad = -30° \end{cases}$ Echelle : 1 cm ↔ 2 V

5)



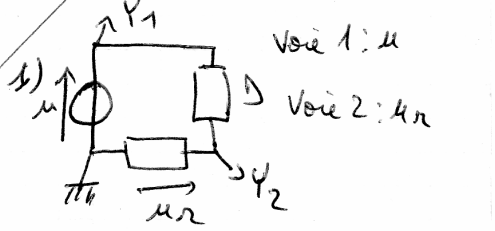
6) On mesure $\vec{U}_3$: 14,2 cm $\Rightarrow \boxed{U_3 = 28,4\ V}$

$\boxed{\varphi_3 = -2°} = -2 \times \frac{\pi}{180}\ rad$

$\varphi_3 = -0,035\ rad$

$\Rightarrow$ équation horaire : $\boxed{u_3(t) = 28,4\sqrt{2}\sin(314t - 0,035)}$

Ex2



2) $T = 6,65 \times 500 = \boxed{3325\ \mu s = 3,325\ ms}$

3) $f = \frac{1}{T} = \frac{1}{3,325 \cdot 10^{-3}} = \boxed{300\ Hz}$

4) $\hat{U} = \hat{U}_1 = 2,63 \times 2 = \boxed{5,26\ V}$ 5) $U = \frac{\hat{U}}{\sqrt{2}} = \boxed{3,7\ V}$; $U_1 = \frac{\hat{U}_1}{\sqrt{2}} = \boxed{1,15\ V}$

$\hat{U}_1 = \hat{U}_2 = 3,25 \times 0,5 = \boxed{1,625\ V}$

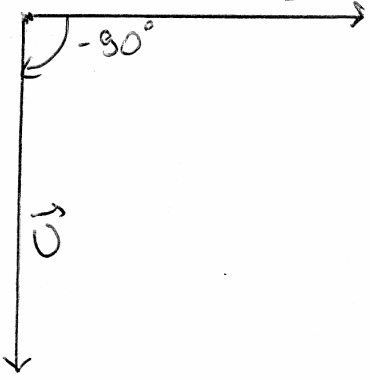
6) u_R est <u>en retard</u> sur u, d'après l'oscillogramme $\Rightarrow$ son déphasage φ est <u>positif</u>

$\varphi = 360\ \frac{d}{D} = 360 \times \frac{0,75}{6,65} = \boxed{40°}$

Ex3 1.1. $Z_C = \frac{1}{C\omega} = \frac{1}{40 \cdot 10^{-3} \times 2\pi \times 1,5 \times 10^3} = \boxed{2650\ \Omega}$

1.2. $U = Z_C I = 2650 \times 0,01 = \boxed{26,5\ V}$

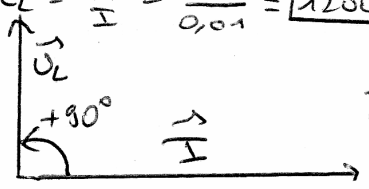
1.3. $\vec{I} \begin{cases} 10\ mA \leftrightarrow 5\ cm \\ 0° \end{cases}$ $\vec{U} \begin{cases} 26,5\ V \leftrightarrow \frac{26,5}{5} = 5,3\ cm \\ -90° \end{cases}$



2.1. $Z_L = \frac{U}{I} = \frac{12}{0,01} = \boxed{1200\ \Omega}$; 2.2 $Z_L = L\omega \Rightarrow L = \frac{Z_L}{\omega}$

$L = \frac{1200}{2\pi \cdot 1,5 \cdot 10^3} = \boxed{0,127\ H}$

2.3



$\vec{U}_L \begin{cases} 2,4\ cm \\ 90° \end{cases}$