Po 206 - Onde plane de pression et de déplacement - Niveau d'intensité

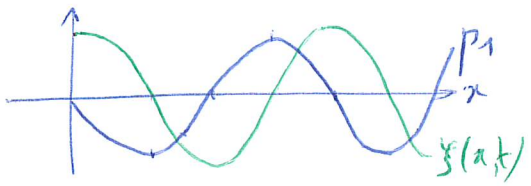
1 - $\xi(x,t) = \xi_0 \cos\left(\frac{2\pi}{T}\left(t - \frac{x}{c}\right)\right)$ $\quad T = \frac{1}{f} = 2$ ms.

$v_1 = \frac{\partial \xi}{\partial t} = -\frac{2\pi}{T}\xi_0 \sin\left(\frac{2\pi}{T}\left(t - \frac{x}{c}\right)\right)$ $\quad c = \sqrt{\frac{\gamma RT}{M}} = 343$ m s^{-1} ; $\mu_0 = \frac{MP_0}{RT} = 1{,}19$ kg m^{-3}

$\mu_0 \frac{\partial v_1}{\partial t} = -\frac{\partial p_1}{\partial x}$

$\mu_0 \frac{4\pi^2}{T^2}\xi_0 \cos\left(\frac{2\pi}{T}\left(t - \frac{x}{c}\right)\right) = -\frac{\partial p_1}{\partial x} \rightarrow p_1 = \mu_0 c \frac{2\pi}{T}\xi_0 \sin\left(\frac{2\pi}{T}\left(t - \frac{x}{c}\right)\right)$

2 -



3 - $I_{dB} = 10 \log\left(\frac{I}{I_0}\right)$ où $I = \langle p_1 v_1 \rangle = \mu_0 c \frac{4\pi^2}{T^2}\xi_0^2 \times \frac{1}{2} = 2{,}0\,10^{-7}$ W m^{-2}

$I_0 = 10^{-12}$ W m^{-2} $\rightarrow$ $I_{dB} = 53$ dB