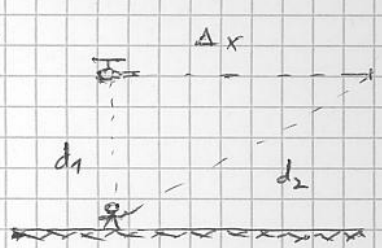
Chapitre 21 : Les sons

16. $S = 21\,cm^2 = 21 \cdot \frac{1}{100} \cdot \frac{1}{100} = 2{,}1 \cdot 10^{-3}\,m^2$

$I_{conversation} = 3{,}2 \cdot 10^{-6}\ \frac{W}{m^2}$

$\Rightarrow P = I \cdot S = 3{,}2 \cdot 10^{-6}\ \frac{W}{m^2} \cdot 2{,}1 \cdot 10^{-3}\,m^2 = \underline{\underline{6{,}7 \cdot 10^{-9}\,W}}$

18.



Soit P la puissance émise par la source

$I = \frac{P}{4\pi d_1^2}$ (1)

$\frac{I}{2} = \frac{P}{4\pi d_2^2}$ (2)

$\frac{(2)}{(1)} = \frac{P}{4\pi d_2^2} \cdot \frac{4\pi d_1^2}{P} = \frac{d_1^2}{d_2^2} = \frac{I/2}{I} = \frac{1}{2}$ $\Rightarrow d_2^2 = \frac{d_1^2}{1/2} = 2 d_1^2$

$\Rightarrow d_2 = d_1\sqrt{2} = 1100\sqrt{2} = \underline{\underline{1556\,m}}$

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26. niveau d'intensité de A : β_A

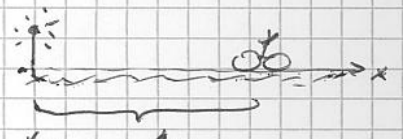
$\begin{cases} \beta_A = 5 + \beta_B & (1) \\ \beta_A = \beta_C - 3 & (2) \end{cases}$ $\Rightarrow \frac{(1)}{(2)} : 1 = \frac{\beta_B + 5}{\beta_C - 3} \Rightarrow \beta_C - 3 = \beta_B + 5 \Rightarrow \beta_C = \beta_B + 8$

$\begin{cases} \beta_C = 10 \log_{10} \frac{I_C}{I_0} \\ \beta_B = 10 \log_{10} \frac{I_B}{I_0} \end{cases}$ $\Rightarrow 10 \log_{10} \frac{I_C}{I_0} = 10 \log_{10} \frac{I_B}{I_0} + 8$

$\Rightarrow 10\left(\log_{10} \frac{I_C}{I_0} - \log_{10} \frac{I_B}{I_0}\right) = 10 \log_{10}\left(\frac{I_C}{I_0} \cdot \frac{I_0}{I_B}\right) = 10 \log_{10}\left(\frac{I_C}{I_B}\right)$

$10 \log_{10}\left(\frac{I_C}{I_B}\right) = 8 \Rightarrow \log_{10}\left(\frac{I_C}{I_B}\right) = 0{,}8 \Rightarrow \frac{I_C}{I_B} = 10^{0{,}8} \simeq \underline{\underline{6{,}3}}$

32.



• Cas général pour l'effet Doppler : $f' = f \cdot \frac{v_{onde} + v_{obs}}{v_{onde} - v_{source}}$

$v_{source} = 0$

$v_{obs} < 0$

$\Rightarrow \frac{f'}{f} = 0{,}9 = \frac{343 - v_{obs}}{343} \Rightarrow 308{,}7 = 343 - v_{obs}$

$\Rightarrow -34{,}3 = -v_{obs}$

$\Rightarrow v_{obs} = 34{,}3\ m/s$

• cinématique : $V_f^2 - V_i^2 = 2a\Delta x$

$\Rightarrow v_{obs}^2 = 2 \cdot a \cdot \Delta x \Rightarrow \Delta x = \frac{v_{obs}^2}{2a} = \frac{34{,}3^2}{2 \cdot 2{,}91} = \underline{\underline{209\,m}}$