

PO 204 - onde sonore dans l'air et dans l'eau

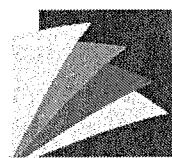
$$1. \quad I = \langle \vec{p} \cdot \vec{v}_n \rangle = \langle p_1 v_1 \rangle = \langle \rho_0 c v_n^2 \rangle = \frac{1}{\rho_0 c} \langle p_1^2 \rangle = \frac{1}{\rho_0 c} P_{airm}^2 = I$$

$$c = \sqrt{\frac{1}{\rho_0 \chi_s}} \rightarrow I = \frac{1}{2} \sqrt{\frac{\chi_s}{\rho_0} \cdot P_{airm}^2} \quad P_{airm} = \sqrt{\frac{\rho_0}{\chi_s} \cdot I}$$

$$\frac{I_{eau}}{I_{air}} = 1 = \sqrt{\frac{\chi_{seau}}{\chi_{sair}} \cdot \frac{\rho_{eau}}{\rho_{air}} \left( \frac{P_{airm}}{P_{air}} \right)^2} \rightarrow \frac{P_{airm}}{P_{air}} = \frac{\left( \frac{\chi_{seau} \cdot \rho_{eau}}{\chi_{sair} \cdot \rho_{air}} \right)^{1/2}}{P_{air}}$$

$$2. \quad \frac{P_{airm}}{P_{air}} = 1 = \frac{I_{eau}}{I_{air}} \cdot \sqrt{\frac{\chi_{seau} \rho_{eau}}{\chi_{sair} \rho_{air}}} \rightarrow \frac{I_{eau}}{I_{air}} = \frac{\left( \frac{\chi_{seau} \rho_{eau}}{\chi_{sair} \rho_{air}} \right)^{1/2}}{P_{air}} \rightarrow \frac{I_{eau}}{I_{air}} = 4,6 \cdot 10^{-3}$$

$$\frac{I_{dBair} - I_{dBseau}}{I_{dBair}} = 37 \text{ dB.}$$



Fénelon Sainte-Marie  
La Plaine Monceau

GROUPE SCOLAIRE

## C.P.G.E. SCIENTIFIQUES

MP2I MPSI PCSI

MPI\* MPI MP\* MP PC\*/PC PSI\*

