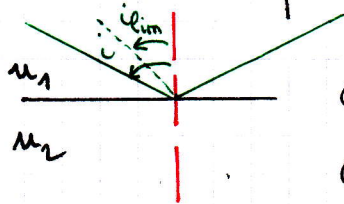


OP010 - Indice de réfraction de l'eau.

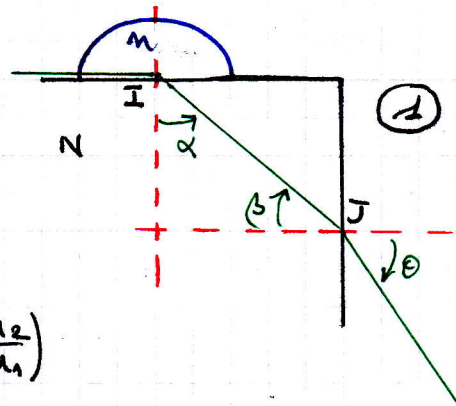
1 -

2 - Conditions de réflexion totale



$$① \quad n_1 > n_2$$

$$② \quad i > i_{\text{lim}} = \arcsin\left(\frac{n_2}{n_1}\right)$$



3 - $\left. \begin{array}{l} n < N \\ N > 1 \\ \text{et } \beta < \arcsin\left(\frac{1}{N}\right) \end{array} \right\}$ pour que le rayon émerge du prisme en J.

$$\beta = \frac{\pi}{2} - \alpha \quad ; \quad \sin \alpha = \frac{n}{N} \quad \rightarrow \quad \cos \alpha = \sqrt{1 - \sin^2 \alpha} = \sqrt{1 - \frac{n^2}{N^2}}$$

$$\sin \beta = \sin\left(\frac{\pi}{2} - \alpha\right) = \cos \alpha < \frac{1}{N}$$

$$\text{d'où } \sqrt{1 - \frac{n^2}{N^2}} < \frac{1}{N} \quad \rightarrow \quad 1 - \frac{n^2}{N^2} < \frac{1}{N^2} \quad \rightarrow \quad 1 - \frac{1}{N^2} < \frac{n^2}{N^2}$$

$$\Rightarrow \boxed{n > \sqrt{N^2 - 1}}$$

Conclusion : $\boxed{\sqrt{N^2 - 1} < n < N}$ A.N : $1,281 < n < 1,625$

4 - Loi de la réfraction en J : $N \sin \beta = 1 \cdot \sin \theta$

$$N \cos \alpha = \sin \theta$$

$$N \sqrt{1 - \frac{n_{\text{em}}^2}{N^2}} = \sin \theta \quad \rightarrow \quad N^2 - n_{\text{em}}^2 = \sin^2 \theta$$

$$\rightarrow \boxed{n_{\text{em}} = \sqrt{N^2 - \sin^2 \theta}}$$

A.N : $\underline{n_{\text{em}} = 1,33}$;