

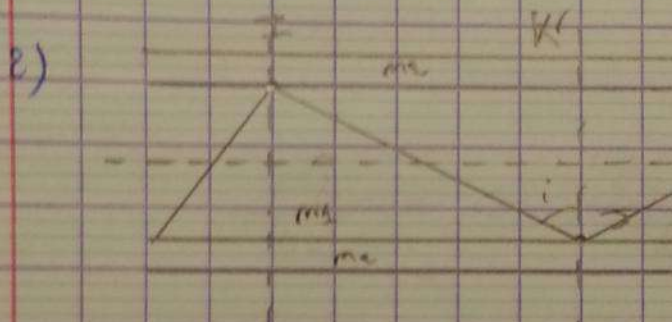
TD4 - Canaux de transmission

Exercice 1

1) L'angle limite de réfraction $n_2 \sin i_L = n_1 \sin(90^\circ)$

$$i_L = \arcsin\left(\frac{n_2}{n_1}\right) = 72,5^\circ$$

Réflexion totale lorsque $i > i_L$



avec pythagore $d = 342 \mu\text{m}$

$$\cos(i) = \frac{JK}{IJ} = \frac{a}{d}$$

$$3) L' = \frac{IJ}{\cos(i)} = 7320 \mu\text{m}$$

Temps de parcours Paris/NY avec $v = \frac{c}{n_1}$

$$T = \frac{L'}{\frac{c}{n_1}} = 37 \mu\text{s}$$

$$4) D = 2 \times \sqrt{R^2 + \left(\frac{L}{2}\right)^2} \approx 37165 \times 2 \\ \approx 74300$$

$$T = \frac{D}{c} \approx 250 \mu\text{s}$$

$$\frac{T}{2} = 7$$

Exercice 2

$$1) P_R = \frac{P_E}{4\pi R^2} = \frac{100}{4\pi (3600000)^2} = \dots \text{ W/m}^2$$

$$2) P_R = \frac{P_E \times G_E}{4\pi R^2} \quad \text{et} \quad G_E = \frac{P_R \times 4\pi R^2}{P_E} = \frac{0,271 \cdot 10^{-10} \times 4\pi R^2}{100}$$

$$G_E(\text{dB}) = 10 \log(G_E)$$

$$3) P_{IRE} = P_E \times G_E$$

$$4) \text{p. 17} \quad G = \frac{4\pi S}{\lambda^2} \Rightarrow S = \frac{\lambda^2 G}{4\pi}$$