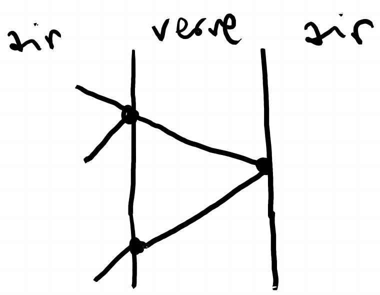
Ex 1 :

1) $r_{air/verre} = \dfrac{1-n}{1+n} = -0,219$

⚠ $r_{verre/air} = 0,219$

$r^2 + t^2 = 1 \Rightarrow t = \sqrt{1-r^2} = 0,976$

2) a) $E_{R_1} = E_i \, r_{air/verre}$



$E_{R_2} = E_i \, t \, r_{verre/air} \, t$

$$\frac{E_{R_1}}{E_{R_2}} = \frac{\cancel{E_i}\,(-0,219)}{\cancel{E_i}\,(0,219)(0,976)^2} = -\frac{1}{(0,976)^2} = $$

$$= -1,05$$

b) $C = \dfrac{I_{max} - I_{min}}{I_{max} + I_{min}} = 2\,\dfrac{E_{R_1} E_{R_2}}{E_{R_1}^2 + E_{R_2}^2} =$

$$E_{R_1} = \frac{E_{R_1}}{\cancel{E_{R_2}}}\,\cancel{E_{R_2}}$$

$$= 2\,\frac{\frac{E_{R_1}}{E_{R_2}} E_{R_2} E_{R_2}}{\left(\frac{E_{R_1}}{E_{R_2}} E_{R_2}\right)^2 + E_{R_2}^2} =$$

$$\frac{E_{R_1}}{E_{R_2}} = x \qquad = 2\,\frac{x\,E_{R_2}^2}{x^2 E_{R_2}^2 + E_{R_2}^2} = 2\,\frac{x\,\cancel{E_{R_2}^2}}{\cancel{E_{R_2}^2}(x^2+1)} =$$

$$= \frac{2x}{x^2+1} = \frac{2(-1{,}05)}{(-1{,}05)^2+1} = \frac{-2{,}1}{2{,}1025} =$$

$$= -0{,}999$$

$$C = \frac{2x}{x^2+1} \qquad \frac{dC}{dx} = 0$$

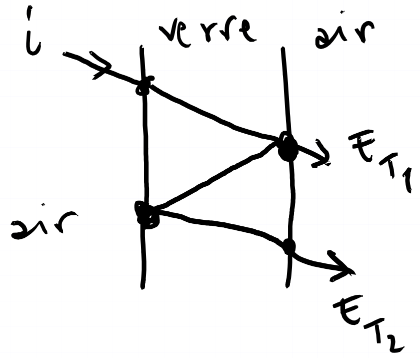
$$\frac{dC}{dx} = \frac{2(x^2+1) - 2x(2x)}{(x^2+1)^2} = \frac{2x^2+2-4x^2}{(x^2+1)^2} = \frac{2-2x^2}{(x^2+1)^2}$$

$$\frac{dC}{dx} = 0 \Rightarrow 2-2x^2 = 0 \Leftrightarrow x^2 = 1$$

$$\Rightarrow x = \pm 1$$

$$\Rightarrow \frac{E_{R_1}}{E_{R_2}} = \pm 1$$

Pour avoir $C_{max} \Rightarrow E_{R_1} = E_{R_2}$ ou $E_{R_1} = -E_{R_2}$

3) 

$$E_{T_1} = E_i t^2 \qquad E_{T_2} = E_i t^2 r^2$$

$$\frac{E_{T_1}}{E_{T_2}} = \frac{E_i t^2}{E_i t^2 r^2} = \frac{1}{r^2} = 20{,}85$$

$$x = \frac{E_{T_1}}{E_{T_2}} \qquad C_T = \frac{2x}{1+x^2} = 0{,}096$$

Le contraste est très faible, la figure d'interférence n'est pas visible.