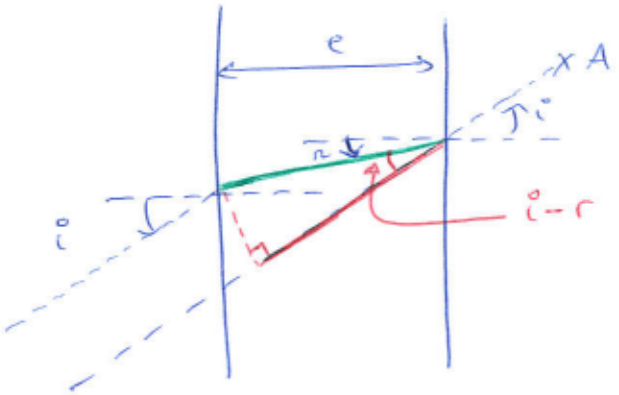
OP2 - 01



$n_{air} \sin i = n \sin r$

δ = (vert) − (rouge)

$$= \frac{ne}{\cos r} - n_{air}\left(\frac{e}{\cos r}\cos(i-r)\right)$$

$$= \frac{ne}{\cos r} - \frac{n_{air}\, e}{\cos r}\left(\cos i \cos r + \sin i \sin r\right)$$

$$= e\left(\frac{n}{\cos r} - n_{air}\cos i - n_{air}\frac{\frac{n}{n_{air}}\sin^2 r}{\cos r}\right)$$

$$= e\left(\frac{n}{\cos r} - n_{air}\cos i - \frac{n\left(1-\cos^2 r\right)}{\cos r}\right)$$

$$= e\left(n\cos r - n_{air}\cos i\right)$$