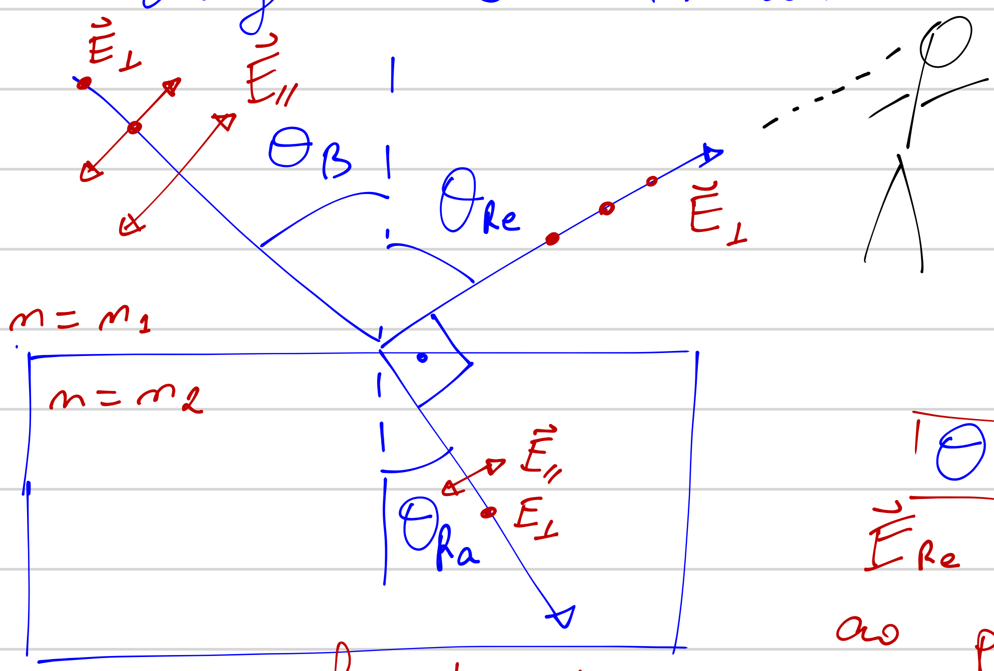
ângulo de Brewster



P/ o ângulo de Brewster θ_B temos

$$\boxed{\theta_{Re} + \theta_{Ra} = 90°}$$

$\vec{E}_{Re}$ apenas na direção $\perp$ ao plano de incidência

Lembrando: o plano de incidência está no plano da tela.

---

aplicando a lei de Snell.

$$n_1 \operatorname{sen} \theta_i = n_2 \operatorname{sen} \theta_{Ra} \qquad \theta_i = \theta_B = \theta_{Re}$$

$$\theta_{Ra} = 90 - \theta_{Re} = 90 - \theta_B$$

$$n_1 \operatorname{sen} \theta_B = n_2 \operatorname{sen}(90 - \theta_B)$$

$$= n_2 \cos \theta_B$$

$$\frac{\operatorname{sen} \theta_B}{\cos \theta_B} = \boxed{\frac{n_2}{n_1} = \operatorname{tg} \theta_B}$$

Lâminas de atraso

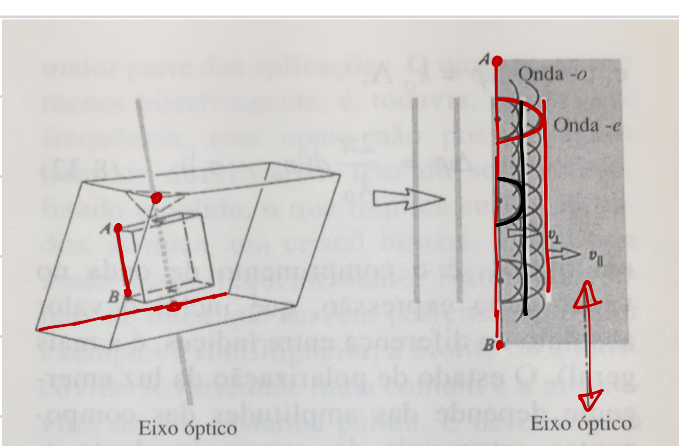


Figura 8.44 Lâmina de calcite cortada paralelamente ao eixo óptico.

↳ de atraso

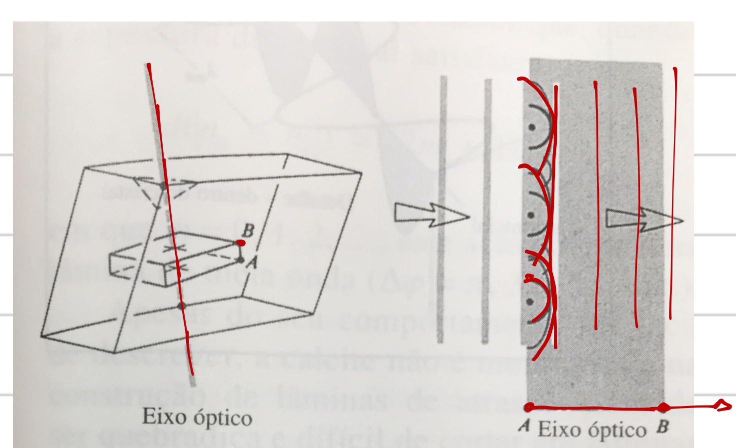


Figura 8.43 Lâmina de calcite cortada perpendicularmente ao eixo óptico.

$v_o = v_e$

$n_o = n_e$

material birrefringente = calcita

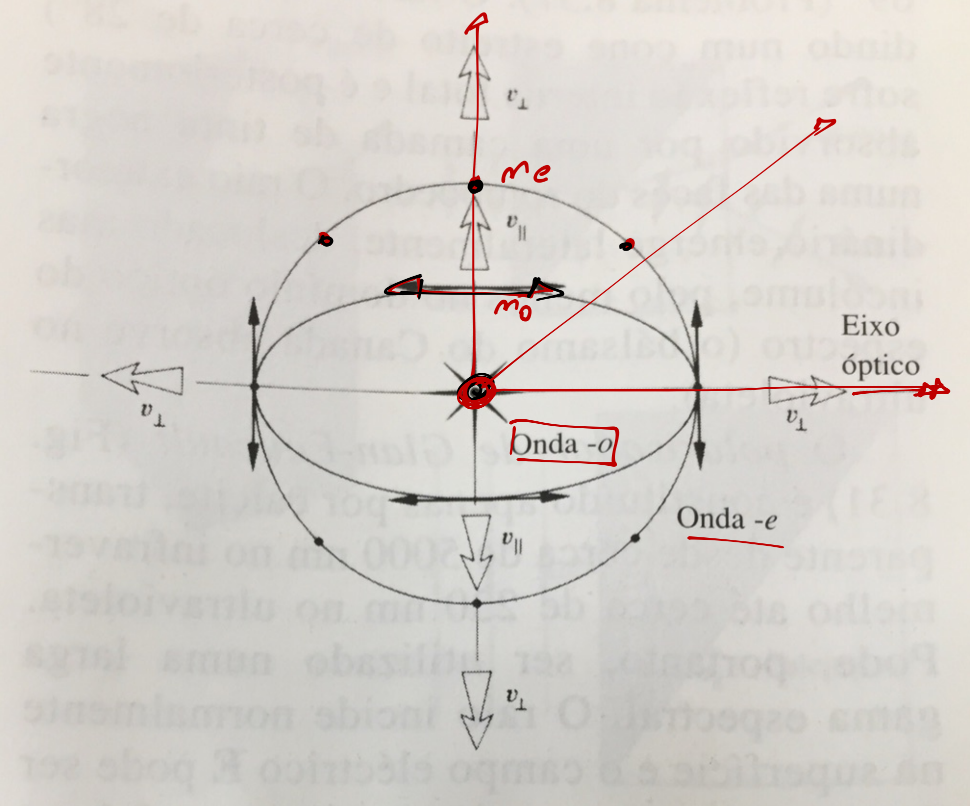
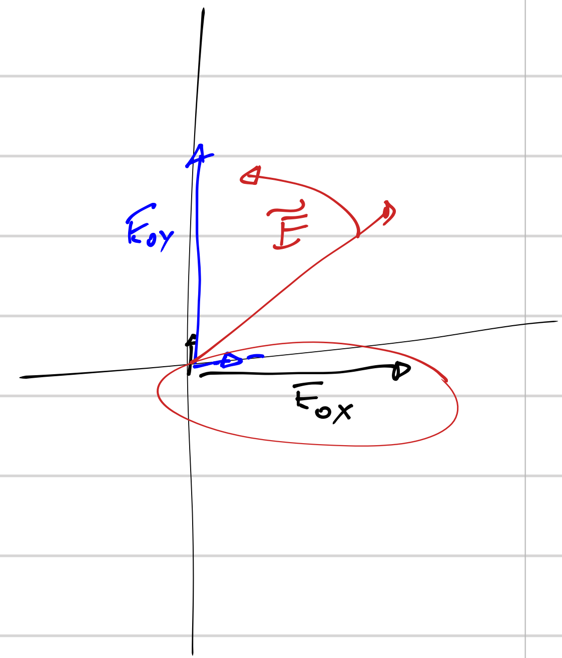
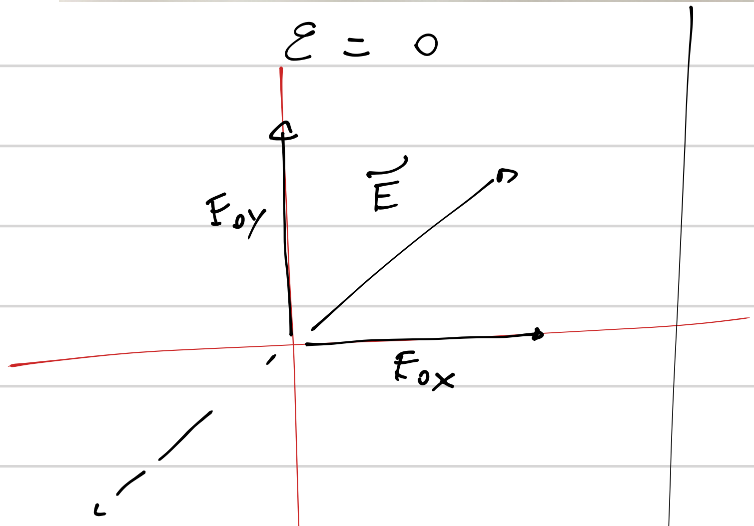
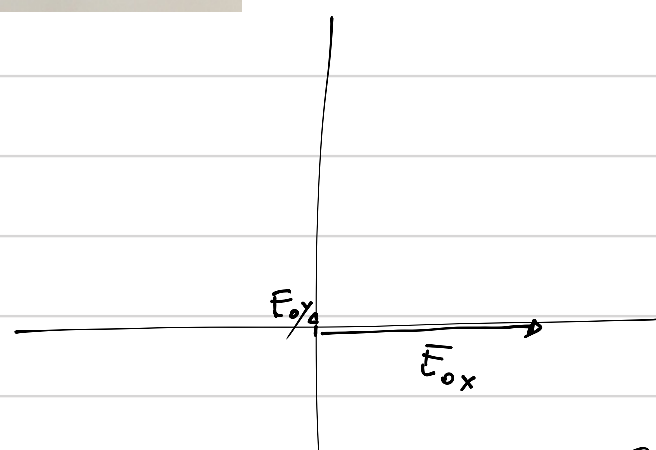


Figura 8.29 Ôndulas num cristal uniaxial positivo.



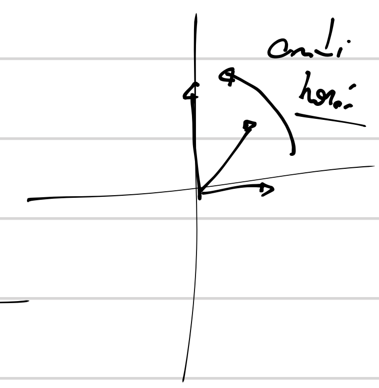


pol. linear

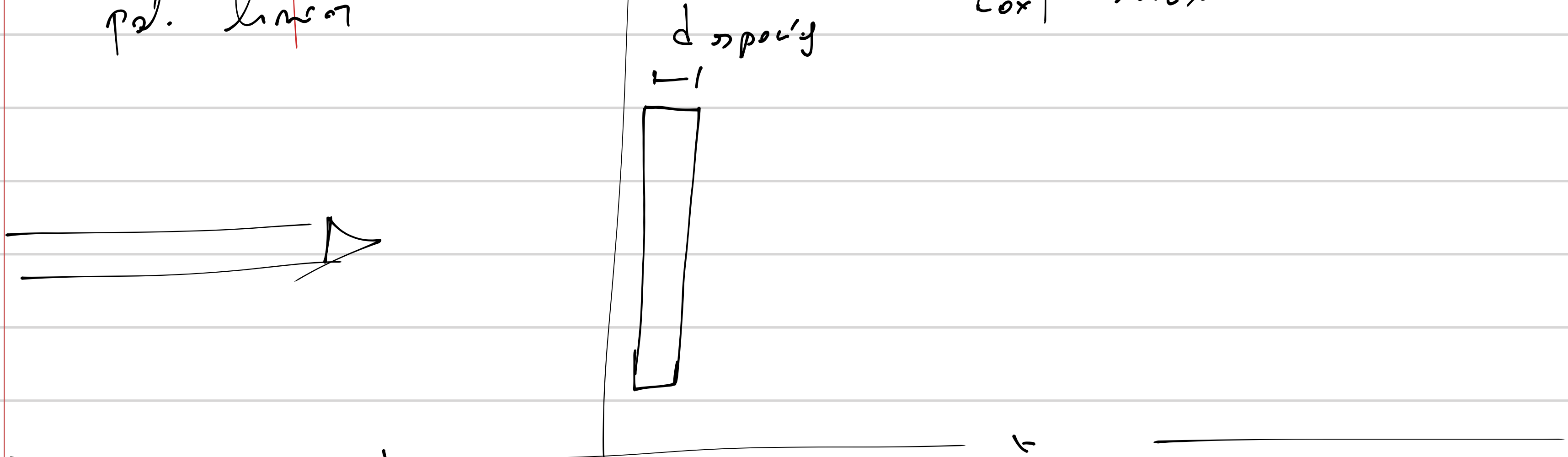


$E_{oy} \to 0$

$E_{ox} \to$ máx



pol. linear



$\Delta\varphi$ = dif. de fase gerada pela lâmina de atraso (da calcita)

$\Delta\varphi = k\Lambda$ $\qquad$ k = número de onda

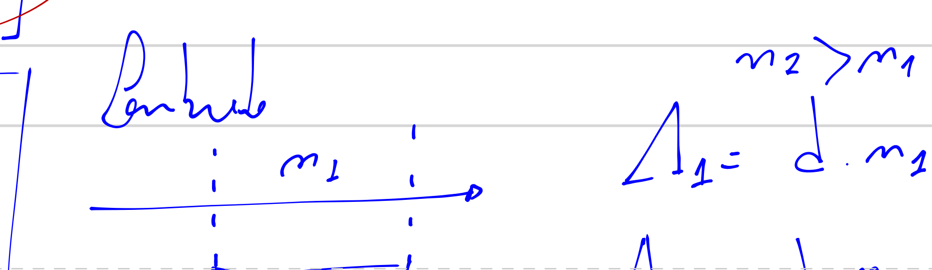
Λ = percurso óptico

$$= \frac{2\pi}{\lambda_0}\left[d\,|(n_o - n_e)|\right]$$

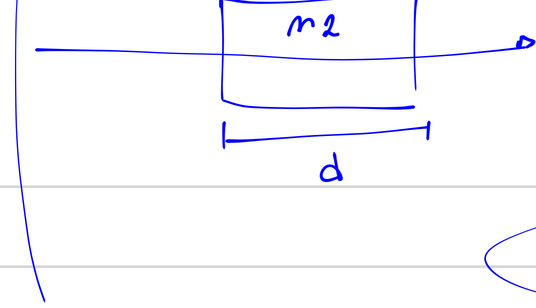
λ_0 = comp. de onda no vácuo

Contudo

$n_2 > n_1$



$\Lambda_1 = d \cdot n_1$



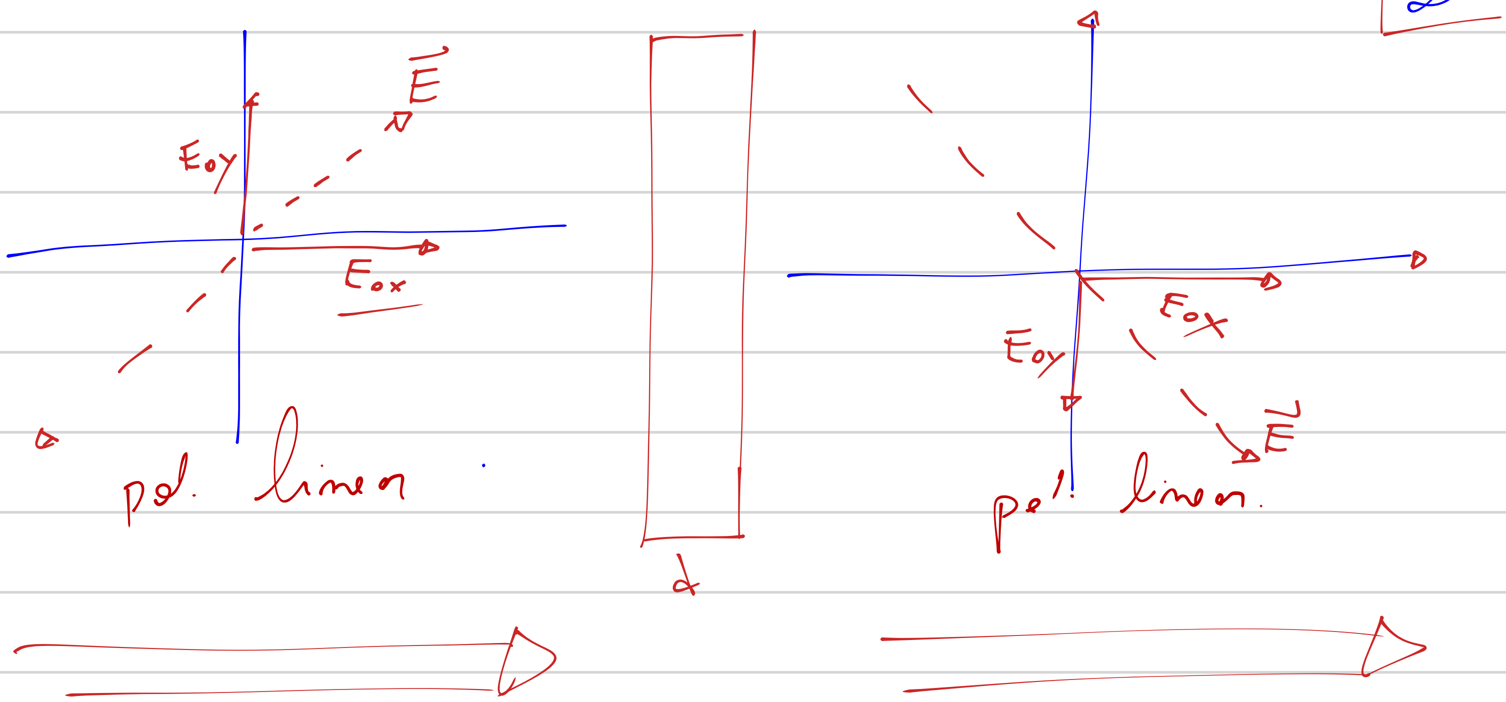
$$\Lambda_2 = d\, n_2$$

$$\Lambda = \Lambda_2 - \Lambda_1$$

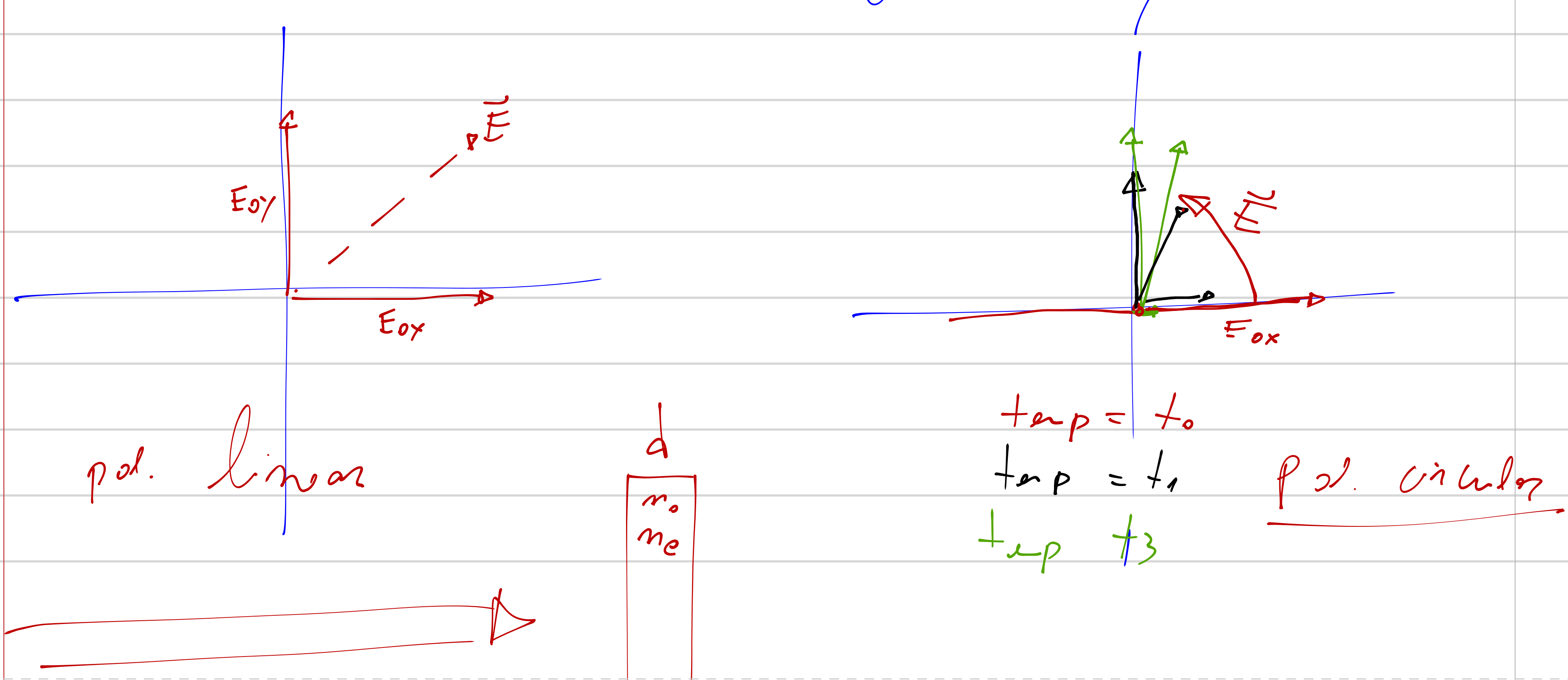
$$\Lambda = d\,(n_2 - n_1)$$

- quando $\Delta\varphi = 2\pi$
  os 2 feixes emergentes saem em fase
  lâmina de onda completa

- quando $\Delta\varphi = \pi$
  lâmina de meia onda
  os dois feixes emergentes saem com diferença $\boxed{\dfrac{\lambda}{2}}$



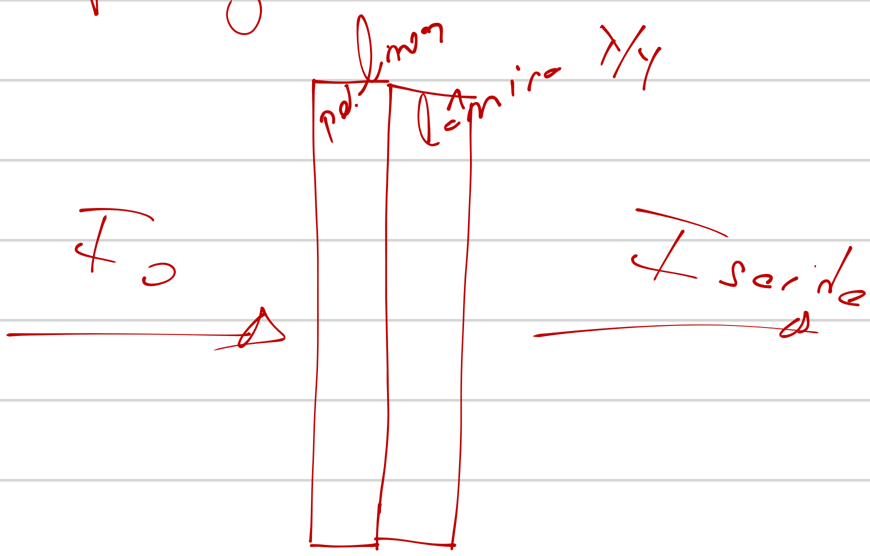
- $\Delta\varphi = \pi/2$ lâmina de quarto de onda →
  feixes emergentes com defasagem de $\dfrac{\lambda}{4}$



$$\boxed{\Delta\varphi = \frac{2\pi}{\lambda_0} d\,|n_o - n_e| = \frac{\pi}{4}}$$

→ para cada λ o $\Delta\varphi$ é $\neq$

polarizador circular (visão lateral)



$$\Delta\varphi_{400} = \frac{2\pi \boxed{d_{400}}}{\lambda_{400}} (n_o - n_e) \ldots\ldots$$

$$\Delta\varphi_{700} = \frac{2\pi \boxed{d_{700}}}{\lambda_{700}} (n_o - n_e)$$