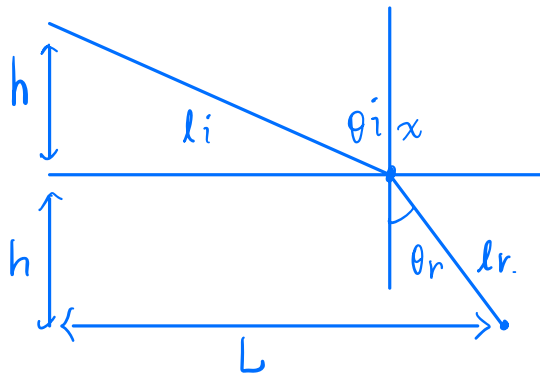○ 費馬定理推導折射定律。

$$t = \frac{l_i}{v_i} + \frac{l_r}{v_r}$$

$$= \frac{\sqrt{x^2 + h^2}}{\frac{c}{n_i}} + \frac{\sqrt{(L-x)^2 + h^2}}{\frac{c}{n_r}}$$

Find extremum of t. (According to Fermat's principle).

$$\frac{dt}{dx} = \frac{2x}{\sqrt{x^2 + h^2} \frac{c}{n_i}} + \frac{-2(L-x)}{\sqrt{(L-x)^2 + h^2} \frac{c}{n_r}} = 0$$

$$\boxed{\frac{x}{\sqrt{x^2 + h^2}}} n_i = \boxed{\frac{L-x}{\sqrt{(L-x)^2 + h^2}}} n_r. \quad \Rightarrow \quad n_i \sin\theta_i = n_r \sin\theta_r \quad (\text{Snell's Law})$$

$$\underbrace{\phantom{\frac{x}{\sqrt{x^2 + h^2}}}}_{\sin\theta_i} \qquad \underbrace{\phantom{\frac{L-x}{\sqrt{(L-x)^2 + h^2}}}}_{\sin\theta_r}$$