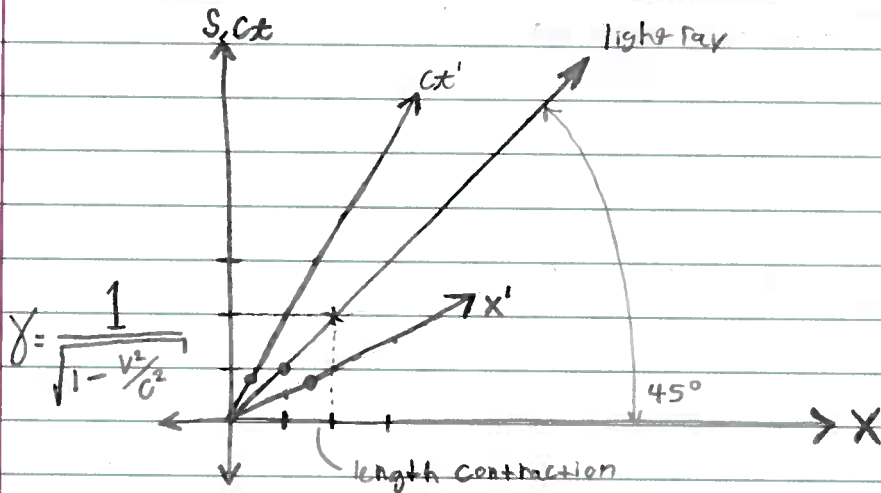


Time dilation

two events can be simultaneous in S but not S'



o highest speed = speed of light

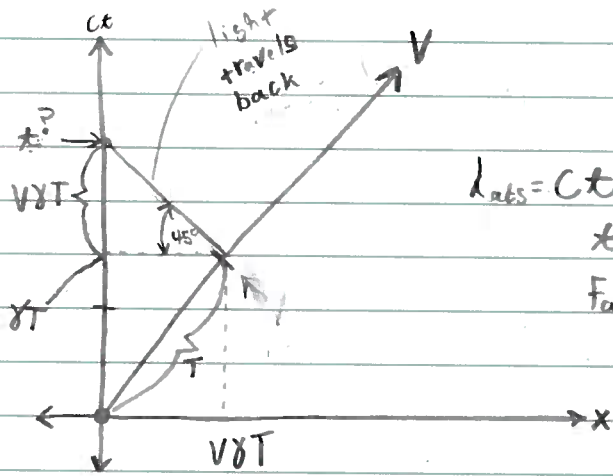
o impossible to observe effect before its cause

o two observers can perceive each others clocks moving slower than their own
(and they can both be right)

o acceleration leads to time dilation (it breaks the symmetry between

o Lorentz transformation: $x \rightarrow x'$ & $ct \rightarrow ct'$

observer



$$\lambda_{\text{obs}} = c\tau = V\delta T + C\delta T$$

$$\tau = \delta T \left(1 + \frac{V}{c}\right) = \lambda_{\text{emit}} \gamma \left(1 + \frac{V}{c}\right)$$

$$f_{\text{obs}} = \frac{1}{\gamma \left(1 + \frac{V}{c}\right)} f_{\text{emit}}$$

$$\lambda_{\text{obs}} = \lambda_{\text{emit}} \cdot \left(1 + \frac{V_x}{c}\right) \sqrt{1 - \frac{V^2}{c^2}}$$