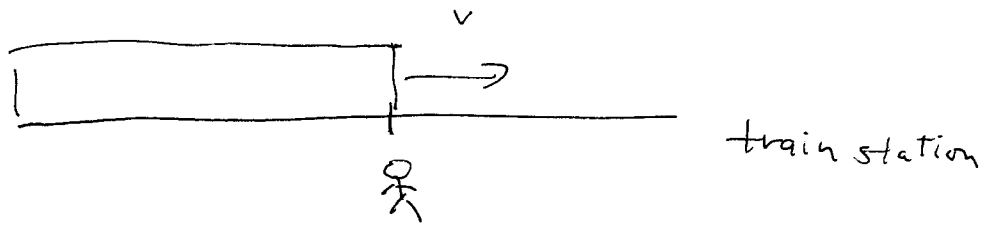
PHY 247 Lecture 15 Gary Shiu 10/11/06

Length contraction : already derived last time but I don't like the proof.
Let's do it slightly differently here.

(1)

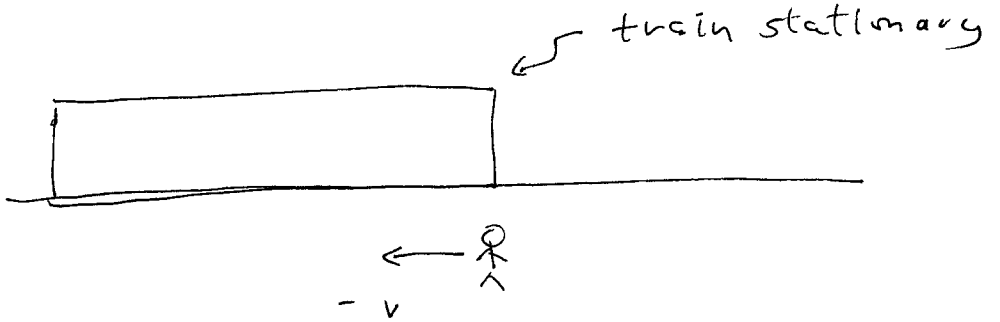


According to observer at train station (you)

$L' = v\,\Delta t'$

$\Delta t'$ = proper time since front + rear end of train pass~~es~~ by at the same position

(2)



Accordig to observer on the train, you are moving from front to rear end of train with vel, $-v$

$L = v\,\Delta t$

$\Delta t \neq$ proper time

$$\Rightarrow L = L' \frac{\Delta t}{\Delta t'} = \gamma L'$$

$$\Rightarrow \boxed{L' = \frac{L}{\gamma}}$$ length contraction.

Moving objects appear to be shorter by $1/\gamma$