

[lex166] Lorentz transformation I

Two simultaneous events in frame \mathcal{F} are separated by a distance $\Delta x = 2\text{m}$. In frame \mathcal{F}' they are separated by $\Delta x' = 4\text{m}$.

- (a) Find the time difference $c\Delta t'$ between the events in frame \mathcal{F}' .
- (b) Find the relative velocity v/c between the two frames.
- (c) Sketch a Minkowski diagram for the two events in frames \mathcal{F} and \mathcal{F}' . Then establish the relationship between Δx , $\Delta x'$, and $c\Delta t'$ by geometric means from the diagram.

Solution: