

The Galilean transformation between S' and S is:

$$x = x' + vt$$

The Lorentz transformation will introduce a γ , where do you think it goes? And why?

ANNOUNCEMENTS

- Quiz 6 (Due next Monday)
 - Use special relativity to investigate the effects of particle detection
 - Compare two events observed from different frames
- Homework 12 (Due next Monday)
 - Will accept through Wednesday

I'm in frame S , and you are in Frame S' , which moves with speed V in the $+x$ direction.

An object moves in the S' frame in the $+x$ direction with speed v'_x . Do I measure its x component of velocity to be

$$v_x = v'_x?$$

A. Yes

B. No

C. ???

I'm in frame S , and you are in Frame S' , which moves with speed V in the $+x$ direction.

An object moves in the S' frame in the $+y$ direction with speed v'_y . Do I measure its y component of velocity to be

$$v_y = v'_y?$$

A. Yes

B. No

C. ???

With Einstein's velocity addition rule,

$$u = \frac{u' + v}{1 + \frac{u'v}{c^2}}$$

what happens when v is very small compared to c ?

- A. $u \rightarrow 0$
- B. $u \rightarrow c$
- C. $u \rightarrow \infty$
- D. $u \approx u' + v$
- E. Something else

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I have seen the Einstein summation notation before:

$$\mathbf{a} \cdot \mathbf{b} \equiv a_{\mu} b^{\mu}$$

- A. Yes and I'm comfortable with it
- B. Yes, but I'm just a little rusty with it
- C. Yes, but I don't remember it it all
- D. Nope

True or False: The dot product (in 3 space) is invariant to rotations.

$$\mathbf{a} \cdot \mathbf{b} \equiv a_\mu b^\mu$$

- A. True
- B. False
- C. No idea

Displacement is a defined quantity

$$\Delta x^\mu \equiv (x_A^\mu - x_B^\mu)$$

Is the displacement a contravariant 4-vector?

- A. Yes
- B. No
- C. Umm...don't know how to tell
- D. None of these.

Be ready to explain your answer.

The displacement between two events Δx^μ is a contravariant 4-vector.

Is $5\Delta x^\mu$ also a 4-vector?

A. Yes

B. No

The displacement between two events Δx^μ is a contravariant 4-vector.

Is $\Delta x^\mu / \Delta t$ also a 4-vector (where Δt is the time between in events in some frame)?

A. Yes

B. No

The displacement between two events Δx^μ is a contravariant 4-vector.

Is $\Delta x^\mu / \Delta \tau$ also a 4-vector (where $\Delta \tau$ is the proper time)?

A. Yes

B. No