

## The derivation of SR: made from maths mistakes

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Einstein states his two postulates: Principle of relativity and lightspeed constancy. He starts his calculation from Newtonian physics. Now Newtonian physics already has the principle of relativity within itself and calls it Galilean relativity. So all Einstein is doing is working within Galilean relativity and saying consider the case of lightspeed constancy. If he does his maths correctly then he should still be within Galilean relativity. But instead of being consistent within Galilean relativity he decides Galilean Relativity does not work and creates his own relativity called Special Relativity. Special Relativity (SR) springs forth from Galilean relativity by making math mistakes within Galilean relativity.

### 1. Standard setup of SR

The basic setup for SR is to relate the two equations:

$$x^2 + y^2 + z^2 - c_1^2 t^2 = 0 \quad (1)$$

and

$$x'^2 + y'^2 + z'^2 - c_2^2 t'^2 = 0 \quad (2)$$

i.e. relate the unprimed coordinate frame with the primed coordinate frame.

The mainstream relativist belief is that the Lorentz transformation equations (LT) work but the Galilean transformation equations (GT) do not work.

GT are:

$$\begin{aligned}x' &= x - vt \\y' &= y \\z' &= z \\t' &= t\end{aligned}$$

LT are:

$$\begin{cases} t' &= \gamma (t - vx/c^2) \\ x' &= \gamma (x - vt) \\ y' &= y \\ z' &= z \end{cases}$$

where  $\gamma = 1/\sqrt{1 - v^2/c^2}$

The transformations on z and y are the same in both LT and GT, so we need only concern ourselves with the transformation on t and x; thus the parts of primed and unprimed coordinate equations we are concerned with.

We are considering the case of the motion only in x and x' direction, i.e. lightspeed in that direction as well as v. Then we can simplify with  $y=y'=z=z'=0$  giving:

$$x^2 - c_1^2 t^2 = 0 \quad (1a)$$

and

$$x'^2 - c_2^2 t'^2 = 0 \quad (2a)$$

## 2. Standard use of Galilean relativity within SR scenario

So starting from:

$$x^2 - c_1^2 t^2 = 0 \quad (1a)$$

and

$$x'^2 - c_2^2 t'^2 = 0 \quad (2a)$$

By the postulate of lightspeed constancy this has been interpreted as:

$$c_1 = c_2 = c \quad (3)$$

Rewriting (1a -2b) for this:

$$x^2 - c^2 t^2 = 0 \quad (1b)$$

and

$$x'^2 - c^2 t'^2 = 0 \quad (2b)$$

Now if  $x'$  and  $x$  related by the Galilean equation:

$$x = x' - vt \quad (4)$$

$$t = t' \quad (5)$$

subst (4) this into (1b)

$$x'^2 - 2x'vt + v^2 t'^2 - c^2 t'^2 = 0 \quad (6)$$

and (5) into (2b)

$$x'^2 - c^2 t'^2 = 0$$

gives  $x'^2 = c^2 t'^2$

$$x' = ct \quad (\text{positive solution})$$

Subst this into (6)

$$c^2 t'^2 - 2cvt'^2 + v^2 t'^2 - c^2 t'^2 = 0$$

$$-2cvt'^2 + v^2 t'^2 = 0$$

$$v - c = 0$$

we take that the left hand side does not in general equal zero; so we take it that the equations (4)–(5) don't work.

Einstein then proceeds to change things to LT.

### 3. Correct use of Galilean relativity

Redoing the calculation for Galilean relativity, but now starting from:

$$x^2 - c_1^2 t^2 = 0 \quad (1a)$$

and

$$x'^2 - c_2^2 t'^2 = 0 \quad (2a)$$

And take it that:

$$c_1 = c, \text{ but not } c_2 \quad (7)$$

then (1a–2a) become:

$$x^2 - c^2 t^2 = 0 \quad (1c)$$

and

$$x'^2 - c_2^2 t'^2 = 0 \quad (2c)$$

Now try the Galilean transformations (GT):

$$x = x' - vt \quad (4)$$

$$t = t' \quad (5)$$

So we have:

$$(x' - vt)^2 - c^2 t^2 = 0 \quad (1c)$$

and

$$x'^2 - c_2^2 t'^2 = 0 \quad (2c)$$

From (2c) we have:

$$x'^2 = c_2^2 t'^2$$

$$x' = c_2 t \quad (\text{positive solution})$$

subst in (1c)

$$c_2^2 t^2 - 2v c_2 t^2 + v^2 t^2 - c^2 t^2 = 0$$

$$c_2^2 - 2v c_2 + v^2 - c^2 = 0$$

$$c_2^2 - 2v c_2 + v^2 = c^2$$

$$(c_2 - v)^2 = c^2$$

$$(c_2 - v) = c \quad (\text{positive solution})$$

$$\text{so } c_2 = c + v$$

Hence

Galilean transformation equations :

$$x = x' - vt \quad (4)$$

$$t = t' \quad (5)$$

work for :  $c_2 = c+v$

when placed into:

$$x^2 - c^2t^2 = 0 \quad (1c)$$

and

$$x'^2 - c_2^2t'^2 = 0 \quad (2c)$$

i.e. Galilean relativity works!

#### 4. The issues

Now the issue can be why do the Galilean relativity calculation by method (3) instead of method (2)?

Method (2) is the way that SR presents Galilean relativity, does not get it to work, and so then starts changing things like assuming contrary to Galilean relativity that there is no universal time. So instead of why do it method (3) instead of method (2), the question is really why do pro-SR people do the Galilean relativity wrong?

And the answer to that I think is that the pro-SR people don't really care about getting their maths correct. If there is a way of making a calculation consistent within the context of Galilean Relativity; they don't care; they are much happier misrepresenting Galilean relativity by doing any calculation within the context of Galilean relativity – wrong.

Now the next issue is the vagueness and ambiguity in the way the pr-SR people have setup their SR theory.

From the assumption of lightspeed constancy – it's not really telling us enough information. When came to identifying  $c_1$ ,  $c_2$  and  $c$ , the assumption did not tell us how to do it. Method (2) assumes:

$$c_1 = c_2 = c \quad (3)$$

While to be consistent with Galilean relativity by method (3) it requires:

$$c_1 = c, \text{ but not } c_2 \quad (7)$$

So, all the possible ways that the maths can be performed have not been looked at by the pro-SR people. Their way of setting up SR is so vague that there are possible routes in the maths other than the way they are promoting which they overlook or ignore.

I give is a real possibility that has been overlooked, i.e that Galilean relativity still works. The pro- SR people are not interested in looking at whether their SR theory is really necessary, and not interested in looking at possibilities like maybe Galilean relativity still works if the maths is performed a different way.

On the issue of:

$$c_1 = c, \text{ but not } c_2 \text{ (7)}$$

One might make protests that  $c_2$  should equal  $c$  in equation (2c).

Reminder of the relevant equations:

$$x^2 - c^2t^2 = 0 \text{ (1c)}$$

and

$$x'^2 - c_2^2t'^2 = 0 \text{ (2c)}$$

On the issue of that protest -- but the speed of light  $c$  is being dealt with in equation (1c) and that is getting substituted into equation (2c) by use of (1c), and then the issue is what justification is there for the  $c$  of (1c) to be the  $c_2$  of (2c), which SR maths avoids.

i.e. I switch back the protest to the pro-SR people and say why should  $c_2$  equal  $c$ .

The pro-SR people with their maths just makes unwarranted assumptions such as the type  $c_2 = c$ . Yes,  $c$  is the speed of light, but why assume it equals  $c_2$ , why assume  $c_2$  is the speed of light.

The basis of SR is supposed to be the two postulates (1) Principle of Relativity and (2) constancy of lightspeed  $c$ . But the pro-SR people add their numerous unwarranted assumptions to two postulates. If we strive for consistency within Galilean relativity, we would not be making these unwarranted assumptions and be interpreting things differently.

## 5.Conclusion

Einstein starts his mathematical derivation from Newtonian physics which has postulate (1) he then asks consider the case of lightspeed constancy, extra assumptions are made such as  $c_2 = c$  in order to get maths different from Newtonian physics. Those extra assumptions are just not explicitly stated, and from the Newtonian physics perspective of wanting Newtonian physics to be consistent those hidden assumptions just look like maths mistakes. They especially look like maths mistakes because no justification is given for them.

SR is just developed from maths mistakes made within Newtonian physics. Further those math mistakes lead others to make the same sort of mistakes and more mistakes in numerous other places. For instance sometimes people write  $c+v$  for  $c+v$ , but sometimes they decide it should be  $c$  instead; so that SR is just a collection of maths

mistakes. (c added to v is  $c+v$  by Galilean velocity addition, and by relativistic velocity addition is c. People mix these two additions at random in their SR calculations.)

i.e. the two postulates of SR are really part of Galilean Relativity. The postulate of principle of relativity is already Galilean relativity. And the addition of lightspeed constancy is merely in the scenario of Galilean relativity consider the case of lightspeed being constant.

So, when we correct all the maths mistakes in SR the relativity theory we have is Galilean relativity; SR switches back into becoming Galilean relativity.

In General relativity Einstein continues with making maths mistakes. It seems that it should be interpreted from the Newtonian perspective that lightspeed is no longer constant under acceleration and gravity, and that makes lightspeed variable. Einstein sometimes talks of lightspeed being variable in General relativity and sometimes he tries to hide that lightspeed being variable as instead the geometry of space-time being curved (as opposed to flat in SR). As per usual Einstein gives a mixed mess in General relativity as to what he is doing, as he did in SR.

There is from the Newtonian-Galilean perspective no justification for the steps Einstein took with his relativity theories and they look just like a collection of maths mistakes. But from the relativists who follow Einstein, from their point-of-view the maths mistakes they make can be hidden by changing assumptions (whether hidden or explicitly stated), by adding more maths mistakes and so forth.

Note – since there is so much literature on relativity with some many different maths constituting a vast collection of mathematical mistakes of different types; it has only been possible to highlight the general nature of the mathematical errors.

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