Relativity Is Self-Defeated (1 of 3)
—In Terms of Mathematics

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Abstract This paper shows how $c=0$ for the speed of light must be led to by relativity's mathematical derivation. In other words, relativity mathematically destroys its own assumption as well as conclusion that speed of light has the commonly known value of $c = 3 \times 10^5 km/sec$.

There is no need to elaborate how damaging $c=0$ can be to relativity's validity. Therefore, that the theory of relativity is a product of invalid mathematical operation can be naturally concluded by a reader for this paper.

Key Words Lorentz factor, speed of light

1. Mathematical Development leading to *c=0*

Lorentz transformation begins its work with an equation set that can be summarized, but with more direct wording, by textbooks introducing Einstein's relativity to students:

$$
\begin{aligned}
x' &= a_{11}x + a_{12}y + a_{13}z + a_{14}t \\
y' &= a_{21}x + a_{22}y + a_{23}z + a_{24}t \\
z' &= a_{31}x + a_{32}y + a_{33}z + a_{34}t \\
t' &= a_{41}x + a_{42}y + a_{43}z + a_{44}t
\end{aligned}
\qquad \text{(Eq. 1 a-d)}
$$

The task of (Eq. 1a-d) is to find all a's as unknowns while all t's, x's, y's, z's are given the status as if they had been constants. With many supplemental conditions, (Eq. 1a-d) finally boils down to the following set:

$$
\begin{aligned}
x' &= a_{11}(x - vt) \\
y' &= y \\
z' &= z \\
t' &= a_{41}x + a_{44}t
\end{aligned}
\qquad \text{(Eq. 2 a-d)}
$$

If all *a'*s remain as unknowns, (Eq. 2a-d) is a set with three unknowns but only two relevant equations, and is then unsolvable. To overcome the difficulties, both the derivation of Lorentz transformation and Einstein's work introduce new information with

$$x^2 + y^2 + z^2 = c^2t^2$$
$$x'^2 + y'^2 + z'^2 = c^2t'^2 \qquad \text{(Eq. 3 a, b)}$$

Given that $y'=y$ and $z'=z$ are redundant and they eventually reduce to zero, the useful information in (Eq. 3a, b) actually only contains

$$x^2 = c^2t^2$$
$$x'^2 = c^2t'^2 \qquad \text{(Eq. 4 a, b)}$$

Putting everything together, all the above information can lead to an equation set that reads

$$x' = a_{11}(x - vt)$$
$$t' = a_{41}x + a_{44}t$$
$$x^2 = c^2t^2 \qquad \text{(Eq. 5a-d)}$$
$$x'^2 = c^2t'^2$$

Mathematically, the introduction of (Eq. 3a, b) is to say that the spherical space occupied by the light starts its expansion at $t=t'=0$. As far as each of the **X** axis and **X'** axis is concerned, light must propagate along them in both the positive and negative directions with speed of equal absolute value, which is c. Therefore, in the inspection of the **x** observer, he must say that the **X'** axis and the light front both move in the same direction pointing toward the positive end of his **X** axis. Looking toward the negative end, he must say that the light front and the **X'** axis move in opposite direction between each other (Fig. 1).

The introduction of (Eq. 3a, b), or equivalently, the introduction of (Eq. 4a, b), makes it indisputable that (Eq. 5a-d) is conditioned to be solved in the following way: No matter how time develops, each observer must see that the origin of one's own axis and the center of the light sphere coincide forever in each observer's inspection. (Eq. 5a-d) obviously mandates that the three unknowns must simultaneously satisfy four equations.

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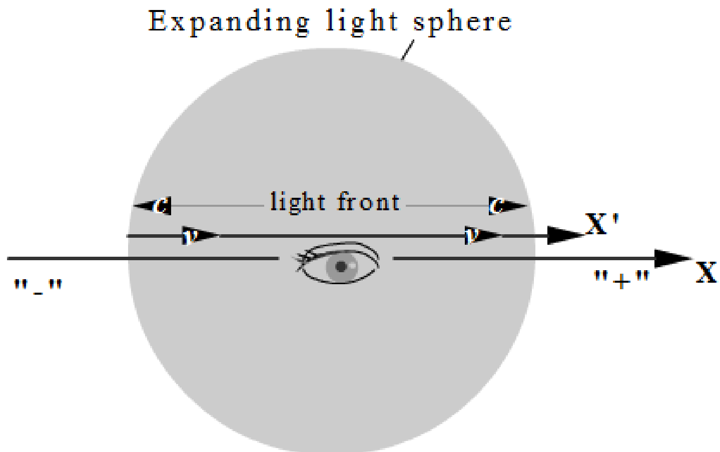

Fig. 1

The distance between the light front and a certain point on the **X**' axis, such as the origin, must continuously changes in his inspection. It is at this point that Einstein's relativity steps in to guide how the observer should calculate the distance change in identical situation. The guidance can be found in a paragraph from *§2* of the Relativity paper of 1905:

Let a ray of light depart from A at the time t_A, let it be reflected at B at the time t_B, and reach A again at the time t'_A. Taking into consideration the principle of the constancy of the velocity of light we find that

$$t_B - t_A = \frac{r_{AB}}{c-v}$$ (Eq. Re-A, for the ray and rod moving in same direction)

and $$t'_A - t_B = \frac{r_{AB}}{c+v}$$ (Eq. Re-B, for the ray and rod moving in opposite direction)

where r_{AB} denotes the length of the moving rod—measured in the stationary system.

[Both Eq. Re-A and Eq. Re-B and the comments inside the parenthesis are notes from this author]

In this quoted paragraph, right at the very moment of emission of the ray, the location on the stationary system where point ***A*** matches must be seen by relativity as where the light source of the ray is, or equivalently, as the center of a light sphere is. Among all the rays forming this sphere, the ray in the concern of the above quoted paragraph is only one of them. Please note: the light source as a physical entity may be attached to r_{AB}, or the **X** axis, but may not be both. Regardless of how the source is attached, however, in the observation of the **X** observer, the center of the expanding light sphere must, as mandated by (Eq. 3a), be stationary to the **X** observer once the light ray emits.

The quoted paragraph further tells us that, for the light and the axis that an observer sees moving in the same direction, the relationship between distance, time, and speed should be established according to (Eq. Re-A). If the light and the axis are moving in opposite direction, the relationship between distance, time, and speed should be established according to (Eq. Re-B). In both situations, time is quoted from a clock next to the stationary observer.

Therefore, with the principle found in the above quoted paragraph, when seeing the light ray and the **X'** axis moving in the same direction, the **X** observer will obtain a distance r'_+ on the **X'** axis such that

$$\frac{r'_+}{c-v} = t \qquad (Eq. \quad 6)$$

where *t* is the amount of time that the ray requires to cover r'_+, starting from *t=0*, of course, and registered by the clock next to the **X** observer.

For the movement in the opposite direction, this observer will obtain a distance r'_- covered by the light traveling on the **X'** axis with the same amount of time *t* such that

$$\frac{r'_-}{c+v} = t \qquad (Eq. \quad 7)$$

(Eq. 6) and (Eq. 7) must lead this **X** observer to have

$$\frac{r'_+}{c-v} = t = \frac{r'_-}{c+v} \qquad (Eq. \quad 8)$$

or further

$$\frac{r'_+}{r'_-} = \frac{c-v}{c+v} \qquad (Eq. \quad 9)$$

To the observer on the **X'** axis, with *v=0* for his own frame with respect to himself, and with the center of the light sphere to be seen at a point equivalent to point A (of r_{AB}) and to be motionless to him, (Eq. 4b), (Eq. Re-A) and (Eq. Re-B) all together require that he must see

$$r_+ = r_- = ct' \qquad (Eq. \quad 10)$$

where t' is quoted from a clock from his **X'** axis, r_+ and r_- are rest lengths seen from his own **X'** axis.

(Eq. 10) thus leads to

$$\frac{r_+}{r_-} = 1 \qquad (Eq. \quad 11)$$

Then, (Eq. 11) and (Eq. 9) lead to the following development:

$$1 = \frac{r_+}{r_-} = \frac{r_+\sqrt{1-\left(\frac{v}{c}\right)^2}}{r_-\sqrt{1-\left(\frac{v}{c}\right)^2}} = \frac{r'_+}{r'_-} = \frac{c-v}{c+v} \qquad (Eq. \quad 12)$$

where $r'_+ (= r_+\sqrt{1-(^v/_c)^2})$ is the moving length seen by the **X** observer corresponding to the stationary length r_+ seen by the observer on the **X'** axis, and so is r'_- to r_- .
.

(Eq. 12) can be satisfied only if *v=0*; no other value of *v* can satisfy it. This $v=0$ is a plain statement that the introduction of a sphere of light to make (Eq. 1a-d) solvable implicitly forces the set to be solved with a predetermined speed value *v=0*.

Since (Eq. 5a) is supposed to enable us to study the movement of the origin of the **X** axis, where *x=0*, with respect to the **X'** axis, we naturally have

$$x' = a_{11}(0 - vt) \qquad (Eq. \quad 13)$$

However, in the same set of equations, (Eq. 5d) gives *x'=ct'*. Then, (Eq. 13), with the implicit condition *v=0*, inevitably becomes

$$ct' = a_{11}(0 - 0t) = 0 \qquad (Eq. \quad 14)$$

Through (Eq. 14), relativity declares that **the speed of light must be *zero*** whenever and wherever $t' \neq 0$ is found.

With *c=0*, relativity's derivation must force a zero value of *c* to be planted in the denominator of the Lorentz factor

$$\frac{1}{\sqrt{1-\left(\frac{v}{c}\right)^2}}$$

Clearly, so leading to *c=0*, relativity has made Lorentz factor an illegitimate expression in terms of mathematics. Without this factor, there is no relativity. With this factor carrying *c=0* at its denominator, where is the validity of relativity? Because of the mathematical illegitimacy forced on the Lorentz factor by relativity, this author believes that the science world must pay serious attention to review the acceptance of some concept in physics, such as *ct* or *ct'* as the fourth dimension of the universe and the so-called light-cone fantasy that is built on this fourth dimension.

2. *v=0* rejects any legitimacy of calculus operation involving time and length

Let's quote a statement from the relativity's 1905 paper again, which is found in *§3*, ***On the Electrodynamics of Moving Bodies***, by *A. Enistein*:

...or, by inserting the arguments of the function τ and applying the principle of the constancy of the velocity of light in the stationary system: —

$$\frac{1}{2}\left[\tau(0,0,0,t)+\tau\left(0,0,0,t+\frac{x'}{c-v}+\frac{x'}{c+v}\right)\right]=\tau\left(x',0,0,t+\frac{x'}{c-v}\right)\qquad (Eq.\ 15)$$

Hence, if x' be chosen infinitesimally small,

$$\frac{1}{2}\left(\frac{1}{c-v}+\frac{1}{c+v}\right)\frac{\partial\tau}{\partial t}=\frac{\partial\tau}{\partial x'}+\frac{1}{c-v}\frac{\partial\tau}{\partial t},\qquad (Eq.16)$$

Or

$$\frac{\partial\tau}{\partial x'}+\frac{v}{c^2-v^2}\frac{\partial\tau}{\partial t}=0\qquad (Eq.17)$$

[Note: Equation number (Eq. 28), (Eq. 29), (Eq. 30) are notes added by this author.]

The predetermined condition *v=0* between the two frames **X** and **X'** must disallow $\partial x'$ in the above quotation to be establishing; $\partial x'$ is actually an expression of limit approaching zero but can never be a finite value of zero. Nevertheless, if $\partial x'$ must end up taking the finite value zero, it cannot appear in the denominator of a fraction.

References:

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2. **INTRODUCTION TO SPECIAL RELATIVITY**, by *ROBERT RESNICK, 1968*
3. **LORENTZ TRANSFORMATION**, Wikipedia, the free encyclopedia