Relativity's Length Measurement Inconsistency

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1=0? One must feel inconceivable after he found that he is so led by one of the most revered mathematical piece in human history. To expose what is found as an error is to confront, no pleasure but only shock can be found when one feels to be compelled to slip into such a stand. This author wish so much that this 1=0 is a result of his mistaken calculation, but not something led by relativity. However, even setting this inconceivable result aside, calculation via different route shows that zero speed is found to be the only physical state in which special relativity can claim validity for itself; and the equations generated by special relativity can verify just that. It can be found, as demonstrated in the case study presented in this paper, that relativity dismantles the constancy of speed of light, and that relativity "enables" material points of a moving rod to complete extraordinary distance without time consumption in the process of "length contraction".

It is well known that constancy of speed of light is the absolute foundation for this theory to be constructed. If light cannot maintain its constancy on speed, it must be of interest to know what is left to support the validity of this theory. While relativity has equations to forbid the appearance of speed that exceeds the speed of light in nature, the same equations either pushes some speed to exceeding such a speed limit or imposes $c/2$ as another speed limit. Shouldn't we feel irresistible to ask: Why the key points have been so well camouflaged in the derivation of this theory that it can escape the fine-combing done by so many scientists for more than a century? This author believes it is time for us to answer this question. In presenting this review, this author never ceases to wish some people would come forward to help this author realizing how mistakenly this author has been but relativity's integrity is left unchallengeable. Immeasurable thanks to the people who would spend time to examine this paper, or even to correct this author if he would like to do so, are hereby given in advance.

1. Introduction

Mathematical verification performed in this paper shows that special relativity, in studying body movement, has created many pitfalls that violate its own fundamental hypotheses and conclusions.

In the 1905 original paper on relativity, [1] one will find the following transformation equations to connect the coordinates, both spatial and temporal, between two inertial frames, k(ξ, η, ζ, τ) and **K**(x, y, z, t), that move in the sense of k moving in the direction of increasing x at speed v:

$$\begin{aligned} \tau &= \beta\left(t - {vx}/{c^2}\right), \\ \xi &= \beta(x - vt), \\ \eta &= y, \\ \varsigma &= z, \end{aligned} \tag{1a-d}$$

where
$$\beta = 1\Big/\sqrt{1 - {v^2}/{c^2}} \tag{2}$$

Although relativity involves three inertial frames in completing its derivation of the above equations, it is obvious that only coordinates from two frames finally end up being compared in these equations.

It is said that the above equations from relativity are mathematically identical to the standard configuration of Lorentz Transformation Equations (LTE). However, different from the derivation of LTE, relativity has derived them without the concept of an ether. Because the equations from special relativity and LTE share the same mathematical formalism, calculation in the upcoming paragraphs will make no distinction between LTE and special relativity; the same mathematical formalism makes it obvious that the failure of one necessarily means failure of the other. The calculations used in this paper are done on a purely mathematical basis, and do not involve the concept of an ether. Therefore, although LTE is called for in the calculation. This paper is focused instead on the problems with relativity. The most essential hypothetical principle that enables the existence of the LTE is the speed of light, which is said to be universally constant with respect to any inertial frame.

For the purpose of our verification, we need only to concentrate our analysis on the equation of spatial correspondence among (1a-d), i.e., the equation that reads as

$$\xi = \frac{x - vt}{\sqrt{1 - {v^2}/{c^2}}} \tag{1b}$$

To go along with the customary denotation in LTE, which normally uses **X**(x, y, z, t) and **X′**(x', y', z', t') to denote coordinates of two inertial systems, we will rewrite (b in 1a-d) to appear as

$$x' = \frac{x - vt}{\sqrt{1 - {v^2}/{c^2}}} \tag{3}$$

With (3), when both inertial systems are involved in recording more than one event, for event 1 we will have

$$x'_1 = \frac{x_1 - vt_1}{\sqrt{1-\left(v/c\right)^2}} \tag{4}$$

Similarly, for event 2, we will have

$$x'_2 = \frac{x_2 - vt_2}{\sqrt{1-\left(v/c\right)^2}} \tag{5}$$

For event 3

$$x'_3 = \frac{x_3 - vt_3}{\sqrt{1-\left(v/c\right)^2}} \tag{6}$$

2. Case Study

Case 1. *Uniqueness of speed cannot be defined in relativity.*

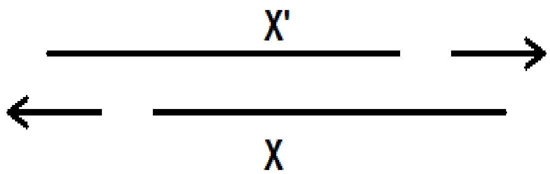

Fig. 1. How is speed determined between frames?

In figure 1, if axis **X′** is said to move at speed v with respect to axis **X** , the location displacement along **X** described by the relative movement of any point marked on **X′** can be simply expressed as $x_2 - x_1$, which can be obtained through

$$x_2 - x_1 = v(t_2 - t_1) \tag{7}$$

for an observer who rides with the **X** system. Similarly, for the location displacement along **X′** described by any point marked on **X**, the same observer would express it as $x'_2 - x'_1$. However, can he also similarly have

$$x'_2 - x'_1 = v(t_2 - t_1) \text{ ?} \tag{8}$$

No! It will be rejected by those who hold to relativity. Relativity would claim that this expression violates the concept of length contraction of a moving rod, when **X′** is the moving rod being observed. If "genuine accuracy" is to be obtained, relativity only accepts an expression that utilizes the aforementioned LTE regarding multiple events. Locating x_1' and x_2' are two consecutive events. Therefore, such expression must take the following form

$$x'_2 - x'_1 = \frac{(x_2 - x_1) - v(t_2 - t_1)}{\sqrt{1-\left(v/c\right)^2}} \tag{9}$$

In locating x_1' and x_2', the same observer will not change his location on **X**; his location displacement on **X** is therefore zero. Subsequently he will have $x_2 - x_1 = 0$ in (9). Then what is left in (9) is

$$x'_2 - x'_1 = \frac{-v(t_2 - t_1)}{\sqrt{1-\left(v/c\right)^2}} \tag{10}$$

or

$$\frac{x'_2 - x'_1}{t_2 - t_1} = \frac{-v}{\sqrt{1-\left(v/c\right)^2}} \tag{11}$$

There is no doubt that $\frac{x'_2 - x'_1}{t_2 - t_1}$ is an expression of speed, which, according to what has been described, should be the speed for the observer's movement with respect to **X′**. Let us denote this speed as v'. Immediately he has

$$v' = \frac{x'_2 - x'_1}{t_2 - t_1} = \frac{-v}{\sqrt{1-\left(v/c\right)^2}} \tag{12}$$

or simply

$$v' = \frac{-v}{\sqrt{1-\left(v/c\right)^2}} \tag{13}$$

In (13), v' and v are obviously of different (absolute) values unless v inside the square root is zero. However, as to the speed value inside the square root, relativity does not indicate which value, v or v′, should be used. Confusion therefore must follow if two frames are said to be passing each other at a certain speed; but at which speed, v or v'? On the other hand, can relativity put any restriction on them in the calculation at all? Let's inspect some numerical examples.

Let us assume some restriction to be applied and have $v=0.8c$ inside the square root. Equation (13) would lead us to have $v'=1.3333c$. **This result contradicts many statements from relativity, typically**: (a) *For v=c, all moving objects --viewed from the "stationary" system--shrivel up into plain figures (§4, [1]);* (b) *It follows… that the velocity of light c cannot be altered by composition with a velocity less than that of light (§5, [1]);* (c) *Velocities greater than that of light have…no possibility of existence (§10, [1]).*

Now relativity leads to a speed of light which these statements, if valid, cannot allow. Indeed, relativity can have statement (a) formulated only if relativity chooses v' to be used inside the square root in calculating length contraction. This is because if v is chosen instead of v′, the implication from relativity would be that light rays have no length, but this is not what we observe. In addition, even if the speed of light is restricted to a set value, relativity even contradicts itself. Shouldn't it be reasonable to expect relativity to at least explain the physical significance regarding $v'=1.3333c$ that appears mathematically, but which relativity itself forbids to appear in nature? On the other hand, without restriction regarding the speed of light, if we use v' in substitution of the speed value inside the square root, we will have

$$v' = \frac{-v}{\sqrt{1-\left(v'/c\right)^2}} \tag{14}$$

where $v' < c$.

By taking the derivative of v with respect to v', or $\left(dv/dv'\right)$, (14) will lead to a maximum value of v, which is $c/2$, at $v' = c/\sqrt{2}$. Now, apparently, in addition to an overall speed limit of c that relativity has been insisting upon, the same relativity throws in another speed limit through (14), which is $c/2$ for any frame moving with respect to an observer if its location displacement is inspected against the observer's frame of reference. This certainly is not so found in high energy labs. [7]

Instead of any restriction on light speed, relativity's choice regarding v or v' is found to be as liberal as it can get. In section §3, few paragraphs before it finalizes the tidy-up of the LTE, relativity introduces a third system of co-ordinates **K′** with the following statement: (the **K′** system) *relatively to the system k is in a state of parallel translatory motion parallel to the axis of X, such that the origin of co-ordinates of system k moves with velocity –v on the axis of X.* [1] Obviously, the origin of *k* in this statement is comparing its location displacement to spatial coordinates quoted from the other system (the **K′** system) in concluding a speed of $-v$. However, the clock which determines the speed is found on the ***k*** system but not on the **K′** system. Therefore, the speed obtained matches perfectly the model of v':

$$\text{speed} = \frac{\text{spatial coordinate difference quoted from one system}}{\text{time recorded by clock from } \textit{another} \text{ system}} \tag{15}$$

In comparison, before it introduces **K′**, relativity's deriving work uses another speed model:

$$\text{speed} = \frac{\text{spatial coordinate difference quoted from one system}}{\text{time recorded by clock from } \textit{the same} \text{ system}} \tag{16}$$

This can be evidenced by the following statement found in the same section: *Now to the origin of one of the two systems (k) let a constant velocity v be imparted in the direction of the increasing x of the other stationary system K…at the time t (this "t" always denotes a time of the stationary system)…* [1] This speed model is that of v, which is shown by (16) but not allowed to be applied in (8) by relativity.

All this indicates that relativity is not taking into account to the physical significance of speed. Indeed, it is puzzling enough to consider why a system that consists of only two moving frames need to have its moving state justified by three speeds: v, v', and c as shown by (13) or (14).

Case 2. *Relativity fails the constancy of speed of light in spite of its reliance on such constancy in developing its equations that are identical to the Lorentz Transformation Equations.*

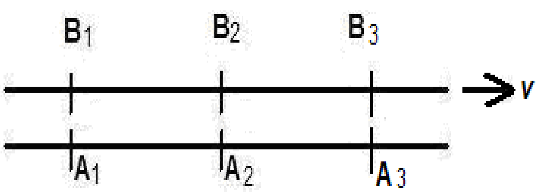

Fig. 2. At t=t′=0, light is seen emitting at where A_2 and B_2 coincide

In figure 2, we set $|B_2B_3| = |B_1B_2| = |A_2A_3| = |A_1A_2|$ = 1 ***l-s*** (*light-second*) as the rest length for each of these linear segments. We further assume that an observer riding on frame A sees frame B moving with respect to his frame at speed $v=0.8c$. Thus

$$\alpha = \sqrt{1-\left(v/c\right)^2} = 0.6 \tag{17}$$

At some time-instant t=t′=0, a light source positioned where A_2 and B_2 coincide emits light toward both the positive and negative directions.

At this point, with this information, the observer on A must be able to make two statements, both supposedly valid: First, as is easily seen, it will take one second by his clock for the light wave fronts to reach A_1 and A_3 simultaneously; and second, using the LTE time conversion, corresponding to the time lapse of one second on his frame, a clock staying at B_2 all the time must read a time lapse of 0.6 seconds which we get from equation (17).

With 1 second from the first statement, the LTE will make the observer expect that the light wave front reaching A_3 will be shared by a point on B that has coordinate value of (+0.333…) *l-s* if the spatial coordinate value of A_2 and B_2 are zero. Likewise, the light wave front reaching A_1 will be shared by another point on B but with coordinate value of (-3) *l-s*. In other words, the same light waves enveloping a linear range of 2 ***l-s*** on A must envelop a linear range of [0.333-(-3)] *l-s* on B. To complete this range in 0.6 seconds of time from the second statement, the light must have a speed:

$$\frac{(1/2)[0.333l\cdot s-(-3l\cdot s)]}{0.6\sec} = 2.77c \tag{18}$$

with respect to frame B. **This speed value certainly shatters relativity's stipulation as well as conclusion on the constancy of speed of light with respect to any inertial system**.

Conversely, from the second statement, at the end of the time interval of 0.6 seconds, relativity must guide the observer to predict that the light wave front from B_2 would have reached a point of (+0.6) *l-s* in one direction and another point of (-0.6) *l-s* in the opposite direction on frame B. Correspondingly, points on A sharing the same light wave front will be (+1.16) *l-s* and (+0.44) *l-s*, respectively. Starting from the 1 second of time lapse from the first statement, relativity indicates the light fronts will not reach the coordinates (both points of +1 *l-s* and -1 *l-s*) on frame A in the same time interval. Given this, light should have a speed on frame A of $\frac{1.16-0.44}{2}$ *l-s/second,* or *0.36 l-s/second.* Now, regarding *1 l-s/second,* and *2.77 l-s/second*, and *0.36 l-s/second*, which value will relativity pick as a constant for the speed of light?

Case 3. *Relativity makes length measurement uncertain.*

(Quotation one, from §2, [1]): *Let there be given a stationary rigid rod* [a rod to be measured]*; and let its length* [that is, the rest length] *be l as measured by a measuring-rod which is also stationary. We now imagine the axis of the rod* [the rod to be measured] *lying along the axis of x of the stationary system of co-ordinates, and that a uniform motion of parallel translation with velocity v along the axis of x in the direction of increasing x is **then** imparted to the rod.*[emphasis added].

With the composite system of movement thus described, relativity develops various concepts that are not found in Newtonian Physics, such as length contraction for a moving rod and time dilation for a moving clock. With the word ***then***, this quoted paragraph inevitably immerses these various concepts into an initial moment in time when $t_0 = 0$. Before this instant, the measuring-rod, the rod to be measured, and the *x* axis are all at rest with respect to each other. After this instant, the rod to be measured is moving with respect to the measuring-rod, which is stationary to the *x* axis. This configuration is described as two operations by the text (omitted here) immediately following the above quoted paragraph. Relativity thus tells us that in the first operation, the rod to be measured experiences no length contraction, but that in the second operation, the same rod shows length contraction in the measurement made by the observer staying on the stationary frame. However, relativity gives no indication regarding how the contraction is processed or completed. When given a time interval of [$t_0-(1/g)$, $t_0+(1/g)$], where g can be any large positive number chosen at will by the stationary observer with the clock next to him, relativity gives us no indication regarding which of the two situations is to be preferred:

Situation 1. The entire rod B, i.e., the rod to be measured, contracts toward B_1 as movement starts (Fig. 4). So at any time-instant $t_{-1}=t_0-(1/g)$, B is found at rest with respect to A, the measuring-rod, as indicated in Fig. 3:

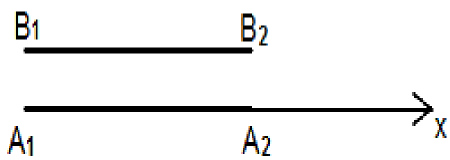

Fig. 3. At $t_{-1}=t_0-(1/g)$

But at another time-instant $t_{+1}=t_0+(1/g)$, B is found moving with contraction as indicated in the following diagram:

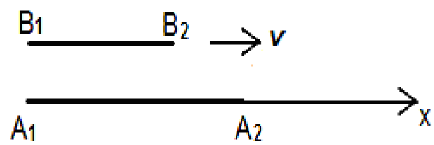

Fig. 4. At $t_{+1}=t_0+(1/g)$

Situation 2: The same rod B, starts from the same rest state as mentioned in fig. 3, and then contracts toward B_2. So at time instant $t_{+1}=t_0+(1/g)$, B is found moving but in a state as indicated in Fig. 5:

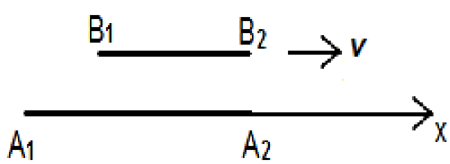

Fig. 5. Also at $t_{+1}=t_0+(1/g)$

If legitimacy is given to either situation, one must find it difficult to explain how, and with how much time consumption, the other end of the rod completes its movement for a length contraction to be detected.

It now becomes necessary for relativity to allow us to imagine a point on B (besides B_1 and B_2) which is stationary and against which the contraction can be measured. Because there is no reason that any particular point on B should be preferred as an anchor point, the inconsistency of length measurement shows up in the following example.

In accord with the first quotation of case 3, we can start the history of movement in which rod A and rod B and the x axis are at rest with respect to each other, and have

$$|A_1A_2|=|B_1B_2|=l \tag{19}$$

At some time instant $t_1>t_0$, B_1 is found matching point A_3 and B_2 matching point A_4, as shown in Fig. 6:

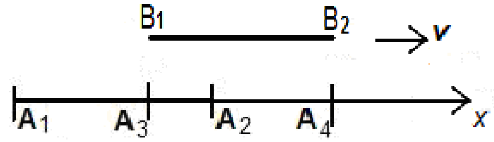

Fig. 6. To determine the length of $|A_1A_4|$

At this time instant t_1, what is the length of $|A_1A_4|$ as measured by the observer riding on rod A, or equivalently, on the x axis?

To this observer, the distance between A_1 and A_2 must be invariant, i.e. $|A_1A_2|=l$ at all times. Speed v, which B_2 is supposed to have, should lead him to have the distance $|A_2A_4|=vt_1$, which further leads to

$$|A_1A_4|=|A_1A_2|+|A_2A_4|=l+vt_1 \tag{20}$$

Such calculation is developed with situation 2 mentioned above. If relativity fails to specify the preference between situation 1 and 2, it should allow the same legitimacy for the same observer to start the measurement with the movement of B_1, instead of B_2. Therefore, because of the movement of B_1, he has

$$|A_1A_3|=vt_1 \tag{21}$$

At t_1, $|A_3A_4|$ matches a length that he sees moving, thus

$$|A_3A_4|=l_{moving}=l\sqrt{1-\left(\frac{v}{c}\right)^2} \tag{22}$$

and further $|A_1A_4|=|A_1A_3|+|A_3A_4|=vt_1+l\sqrt{1-\left(\frac{v}{c}\right)^2}$ (23)

This ~~is a~~ value disagrees with what is shown in (20).

Clearly, this confusion cannot be resolved until relativity is able to present a clear mathematical argument about the movement history associated with the above quoted paragraph. But can it do so? Can relativity, without violating its assumption regarding a constant speed of light, explain how all material points of the rod-to-be-measured would have completed their movement for the length contraction to be detected at the time instant defined by the word ***then***?

3. Root of the Inconsistency

For brevity, let us examine only how popular textbooks usually expose students to relativity. A typical approach [5] can only make relativity's calculation appear improper for any nonzero speed between moving frames. A review regarding these inconsistencies in the original 1905 paper on relativity is also being presented is these proceedings: Mathematical Inconsistency in Relativity's Original Paper of 1905. [14] There I have shown how relativity leads to the result "1=0."

The text book we analyze here begins its mathematical deduction with the following equation set:

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

The task of (24a-d) is to find all a's in order to establish a function, or functions, that correspond to all the spatial and temporal coordinates between two moving systems. With many supplemental conditions, (actually equations with various reasons), (24a-d) finally boils down to

$$\begin{aligned} x' &= a_{11}(x - vt) \\ y' &= y \\ z' &= z \\ t' &= a_{41}x + a_{44}t \end{aligned} \tag{25a-d}$$

If all a's remain as unknowns, equation set (25a-d) is a set with three unknowns but only two relevant equations. To overcome the difficulties in finding a finite solution set, the textbooks introduce new information with

$$\begin{aligned} x^2 + y^2 + z^2 &= c^2t^2 \\ x'^2 + y'^2 + z'^2 &= c^2t'^2 \end{aligned} \tag{26a, b}$$

Given that $y'=y$ and $z'=z$ are redundant and they eventually reduce to zero, the useful information actually contains

$$\begin{aligned} x^2 &= c^2t^2 \\ x'^2 &= c^2t'^2 \end{aligned} \tag{27a, b}$$

Putting everything together, the textbooks come to an equation set that reads

$$\begin{aligned} x' &= a_{11}(x - vt) \\ t' &= a_{41}x + a_{44}t \\ x^2 &= c^2t^2 \\ x'^2 &= c^2t'^2 \end{aligned} \tag{28a-d}$$

The introduction of (26a, b), or equivalently, the introduction of (27a, b) makes it indisputable that (28a-d) is conditioned to be solved in the following way: no matter how time develops, each observer must see no relative movement between the origin of his own frame and the center of the spatial sphere enveloped by the propagation of light. In other words, the origin of the frame and the center of the light sphere coincide forever in each observer's inspection. Before any further calculation can be made, we need to analyze the validity of an equation set with these conditions, i.e., (28a-d). Mathematically, the introduction of (26a, b), namely $\begin{matrix} x^2 + y^2 + z^2 = c^2t^2 \\ x'^2 + y'^2 + z'^2 = c^2t'^2 \end{matrix}$, is to say that the spherical space occupied by light starts its expansion at $t=t'=0$. As far as the x axis and x' axis are concerned, light must propagate along them in both the positive and negative directions, with speeds assumed equal with respect to each of them, of course. The assumed movement of the x' axis to the observer on the x axis should make him believe that the x' axis and light both move in the same direction pointing toward the positive side on his x axis. Looking toward the negative side, the same assumed movement should make him see that the light wave front and the x' axis move in opposite directions relative to each other. The distance between the light front and any given point on the x' axis, such as the origin, would be seen as continuously changing by the observer. How would relativity guide the observer to calculate such a distance change? Let's quote from relativity:

> (Quotation two, from §2, [1]): "*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*
>
> $$t_B - t_A = \frac{r_{AB}}{c - v} \tag{29}$$
>
> and
>
> $$t'_A - t_B = \frac{r_{AB}}{c + v} \tag{30}$$
>
> [Both (29) and (30) are numbered by this author] *where r_{AB} denotes the length of the moving rod—measured in the stationary system.*"

The ray of light departing from A, chosen for the observer's calculation, is only one of the infinitively numerous rays that form an expanding sphere. At the exact moment of emission, the location on the stationary system where point A matches the point of light emission must be envisaged by relativity as the center of the sphere of the light. Relativity allows no disagreement regarding the concept that the observer will not see the center of the light sphere move even though the rod is moving. This quotation further tells us that for the light and a frame that an observer sees moving in the same direction, relativity will set up the relationship between distance and time and speed according to (29). If they are moving in opposite directions, the same observer should set up their relationship according to (30). In both situations, time is marked from a clock next to the observer. Therefore, for the movement in the same direction, the observer on the x axis will obtain a distance r_+ that the light wave front describes on the x' axis with time interval of (t-0) and establishes

$$\frac{r_+}{c - v} = t \tag{31}$$

For the movement in the opposite direction, this observer will obtain a distance r_- that is described by the light traveling on the x' axis and establishes

$$\frac{r_-}{c + v} = t \tag{32}$$

Subsequently, this observer must have

$$\frac{r_+}{c - v} = t = \frac{r_-}{c + v} \tag{33}$$

or further

$$\frac{r_+}{r_-} = \frac{c - v}{c + v} \tag{34}$$

Please note once again: The center of the light sphere is not allowed to move with r_{AB} for (34) to be formulated with respect to the stationary observer. This observer must be stationary to both his x axis as well as the light sphere center. How would the observer who is stationary to the x' axis evaluate the situation? To this observer on x', with $v=0$ concluded ~~from his own frame~~ with respect to himself, and with the center of the light sphere to be claimed at point A, which is motionless to him, (29) and (30) together require that he must see

$$r_+ = r_- = ct' \tag{35}$$

with t' being quoted from a clock from his x' axis. This relationship leads to

$$\frac{r_+}{r_-} = 1 \tag{36}$$

It does not matter how the concept of length contraction of a moving rod may force each observer to believe seeing r_+ (or r_-) with different values. Such a contracting multiplication factor cancels out in the ratio of $\frac{r_+}{r_-}$. Therefore, the exclusively unique and perfect sphere that brings up (27a, b), or $\begin{matrix} x^2 = c^2t^2 \\ x'^2 = c^2t'^2 \end{matrix}$, must force the two observers to come to an agreement between r_+ and r_- such that

$$\frac{c-v}{c+v} = \frac{r_+}{r_-} = 1 \tag{37}$$

This relationship can be satisfied only if $v=0$; no other value of v can satisfy it.

Conversely, when the observer riding on x' axis compares the relative movement between the light wave front and the x axis, believing the origin of his own frame to be the center of the light sphere, the same argument will be applicable from his point of view, again ending up with $v=0$ between him and the x axis. Therefore, the inescapable conclusion is that it is only at zero speed, and no other, that the two observers can agree that each detects (I) a perfect sphere of space occupied by the light propagation and (II) both origins of their own frames to be the center of the light sphere. Whatever solution set that results from both (25a-d), and, as a result, (24a-d), is only good for speed of $v=0$. In other words, the introduction of $\begin{matrix} x^2 = c^2t^2 \\ x'^2 = c^2t'^2 \end{matrix}$, or equivalently $\begin{matrix} x^2 + y^2 + z^2 = c^2t^2 \\ x'^2 + y'^2 + z'^2 = c^2t'^2 \end{matrix}$, just simply kills any nonzero movement between the frames. In mathematical terms, this treatment implicitly forces equation set (24a-d) to be solved with a predetermined speed value of $v=0$. $v=0$ is a necessary and sufficient common condition for each observer to conclude a perfectly but uniquely spherical space occupied by light propagation in his observation while insisting his own frame's origin to be the center of the sphere. When the solution set that is good only for $v=0$ is applied to a nonzero speed between the frames, the application becomes merely a mathematical abstraction which conforms to an accepted rule.

In the original 1905 paper, relativity also relied on the introduction of one spherical space of light propagation but shared by two equations to complete its argument. This means that the remaining arguments of the 1905 paper regarding the relative movement between two frames shares the same fate as what has just been demonstrated; this in contrast to what has been portrayed in the textbooks.

4. Conclusion

Thus, using equations that bear the same formalism as the LTE in dealing with movement, relativity has destined itself to failure in all of the following aspects:

1. It allows no finite value of speed between two frames to describe movement; even the speed limit that it creates and advocates can be shown to have more than one ~~with~~ value in its own equations.
2. Its concept of length contraction brings up contradictory speeds for the material point of a moving rod.
3. Most importantly, relativity turns out to completely shred its own stipulation as well as conclusion about the constancy of the speed of light.

Treated in this fashion, relativity demolishes its own condition regarding the constancy of the speed of light. What then is left to support its validity?

At this point, we have no reason to believe or worry that, as far as Galilean relativity in Newtonian Physics is concerned, a dent has been detected by any theory. [4]

If special relativity has no valid foundation, general relativity may face a similar fate. However, it may be interesting to note that, so far, general relativity is said to be the only theory "being able" to explain the excessive perihelion precession of Mercury, but Newtonian Mechanics seems tarnished in tackling this problem. [4] How can we be sure that we have applied Newtonian Mechanics properly in exploring this topic? But, if relativity is eliminated, all that is left is Newtonian Mechanics.–This author is confident that Mercury's excessive precession should be able to be answered with Newtonian Mechanics but with one condition in mind: There have been other influences affecting Mercury's behavior through history. Let us discuss this briefly.

In space a lighter gravitational body is found moving about a heavier gravitational body. Its loci of steady movement is supposed to allow us to detect a point where the gravitational force between the two bodies exactly cancels out the centrifugal force that is produced by the curving movement of the lighter body. We call this point the *virtual equilibrium point*. At this point, we can regard the apparent velocity of the lighter body to be a resultant velocity of two components: One of them is the velocity on the tangential direction, which will be denoted as v_{vt}, the other one is along the radial direction, which will be denoted as v_{vr} (stipulated with a negative sign for its pointing toward the heavier body). If we further use R_{ve} to denote the distance between the virtual equilibrium point and the gravity center of the heavier body, the entire loci of the lighter body's movement can be describe by [15]

$$R = \frac{R_{ve}}{1 - ({}^{v_{vr}}\!/\!_{v_{vt}})\sin\theta} \tag{38}$$

where R is the distance at any instant in time between the two bodies; and θ is the angle swept by the radius represented by R, starting its zero value one quarter period before the periapsis point appears if an ellipse is resulted from (38). If $\left|\frac{v_{vr}}{v_{vt}}\right| < 1$, (38) will describe a "perfect" ellipse. The ellipse is perfect in the sense that the geometrical location of the apoapsis and periapsis relative to the heavier body must be permanently found with the same coordinate values in space, independent of the progress of time.

Suppose that there was once a time such a perfect ellipse had been established for the Mercury's orbital movement about the Sun. Later, for some reason, a large amount of material was added to the sun while nothing was added to Mercury. Needless to say, the gravitational force afterwards between these two celestial objects would pull Mercury closer to the Sun. However, nothing has changed Mercury's angular momentum. Now, each time before Mercury is about to return to the previous apoapsis, or periapsis at the other end of the ellipse, the newer gravitational force no longer allows it to go that far again; while the original but now "excessive" angular momentum (the result of the conservation principle) must then advance Mercury to move across a longer arc on the orbital curve. This is to say that it takes a little more than 360 degrees if Mercury is to complete the original ellipse; precession thus results. Of course, the new apoapsis and periapsis, which will be related to a new virtual equilibrium point, should both have shorter distances from the Sun compared to the previous ones. Let R'_{ve} be the distance of the new virtual equilibrium point from the Sun, to describe Mercury's loci in a new situation, (38) can be rewritten as

$$R = \frac{R'_{ve}}{1 - \left(v'_{vr} / v'_{vt} \right) \sin(\theta - \omega)} \tag{39}$$

where $\omega = \frac{p}{T} t$, in which $\boldsymbol{p}$ is the total excessive perihelion advancement in one rotation period, T is the time of one orbital period, and t is the planet's traveling time, which begins its initial zero value at where θ takes its initial zero.

Note, however, Eq. (38) is set up with the condition that the two gravitational bodies are absolutely isolated from any other celestial objects so that no perturbation from anything else can affect the movement. Eq. (39) is to be applied if the orbit is nearly circular. Even if excluding perturbation from other objects, reality makes it almost impossible for a lighter body to have established and started an elliptical orbit with conditions that can match ~~out~~ an exact virtual equilibrium point in space. Besides anything else, historical collisions between heavenly objects should have altered precession in the movement of celestial objects from time to time. We cannot possibly have seen all these events.

On the other hand, Mercury's movement must cause tides on the Sun. The tidal action will consume Mercury's angular momentum and change its precession. New periapsis, apoapsis and precession are continuously reestablished in the process of such consumption even if the mass of the Sun and Mercury are unchanged.

Extra Discussion: Redefining the Straight Line

Randomly choose any two points named **a** and **b** from a rigid curve. The segment of the curve so bound between the points is called (**a**~**b**). Let an exact replica of (**a**~**b**) be produced and be called (**a′**~**b′**). Now join (**a**~**b**) and (**a′**~**b′**) in such a manner that point **a** and **b′** merge together at one end and point **b** and **a′** merge together at the other end. After the joining, if any point from (**a**~**b**) must land on (**a′**~**b′**), then (**a**~**b**) is a genuinely straight segment provided the following two conditions are met: First, (**a′**~**b′**) has been allowed to move in space with any freedom it can find while retaining the merging of points **a/b′** and **b/a′**; second, another segment (**c**~**d**) is always allowed to be randomly chosen within (**a**~**b**) such that (**c**~**d**) and its replica can be shown as a straight segment under the same operation in defining (**a**~**b**). If the same operation defining (**a**~**b**) as a straight segment can be applied to any part of the curve from which (**a**~**b**) is quoted, then the entire curve is a straight line in a 3-D space.

A straight line so defined does not agree with the idea that has been found popular in cosmological studies: *an object traveling away in one direction would eventually reappear from the opposite direction*. This needs to be considered: A straight numerical axis extends its length following this traveling object. When the extending end comes back to meet the origin of the axis as the traveling object so reappears, will the numbers attached to the extending end appear as infinitely positive numbers or as …-4, -3, -2, -1, 0?

Euclidean Geometry, one of the high condensations of human wisdom, is unfortunately found to be abused by many liberal "theories" [3, 4, 6], only because it has not completed itself with a rigid definition of straight line.

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