The Ultimate Sophistication of Special Theory of Relativity

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ABSTRACT

With the consideration of the light which carries the photon particles, the Lorentz transformation was constructed with an impressive mathematical approach. But the generalization of that equation for all the velocities of the universe is direct enforcement on other things not to travel faster than light. It has created serious issues in every scientific research that was done in the last century based on the special theory of relativity. This paper replaces the velocity of light with some other velocities and shows us the possible consequences and highlights the issues of special relativity. If I travel through my past or future and was able to see another me there, who would be the real Hamdoon I or the one I see there in the past or future! If the real one is only me, the one I saw, is not me, so, I could not travel through my or someone else's past or future. Therefore, no one can travel through time. If both of us are the same, can the key of personal identity be duplicated or be separated into two or more parts? These are some of the fundamental philosophical arguments that annihilate the concept of time travel which is one of the sequels of special relativity.

INTRODUCTION

Over a century our scientific research being taken into a wrong phase; far beyond the reality and facts of nature. Since Einstein's miraculous year, 1905, the world changed its view about events and time; energy and mass. The future of science seemed to be based on Einstein's ideology on relativity. Thereon, all the researches that were based on this took us into a dilemma; confusing ideologies about the universe; drove the science of nature away from the understanding of the human mind. When the research was carried out as an attempt to prove the none-equitability of energy and mass (Khan, 2020), it was inevitable to impeach the fundamental ideologies behind the concept of mass and energy equivalence. The mathematical part of relativity is excellently done. But this itself turned to be an impenetrable trap against scientific research for more than a century.

Though there were some remarkable objections against the ideology of relativity, no significant evidence was there to endorse their claims. One of the famous such objections is "Einstein's relativity work is a magnificent mathematical garb which fascinates, dazzles and makes people blind to the underlying errors. The theory is like a beggar clothed in purple whom ignorant people take for a king... its exponents are brilliant men, but they are meta-physicists rather than

scientists."(Kakos, 2020). As the concept of relativity leads us into metaphysical aspects, unavoidably this paper will experience some philosophical arguments.

The objections against relativity were taken, a step further with the help of paradoxes such as twin paradox, pole and barn paradox, grandfather paradox, and so forth. But somehow the exponents of relativity were able to protect the credo of relativity with some responses to those paradoxes. But a logical approach to those responses persuades us to suspect their understanding of special relativity. though we could appeal for the defensibility of those paradoxes against special relativity, in order to make my arguments on the point and non-opposable, I have come up with four well-constructed paradoxes rather than evocating for the existing ones.

If the Lorentz transformation was derived with something slower than the light, the velocities of objects in the universe would be restricted more including photons, or with something faster than the light; the objects would be allowed mathematically to move even swiftly. Mathematically no objections could be placed against the special theory of relativity. But yet, it is far beyond the acceptance in the nature of reality.

As modern physics is constructed on the foundation of the special theory of relativity, only by questing these fundamentals and scrutinizing all the researches that were built upon these, we can take the future of physics into the scrupulous track. And this would allow us to understand the real nature of our universe.

TRANSFORMATION EQUATIONS

Imagine two Nikola clocks; one is stationary and the other is in movement at constant velocity v relative to the stationary clock. The Nikola particle travels between two frames crossing the distance L the way up and the way down at constant velocity χ.
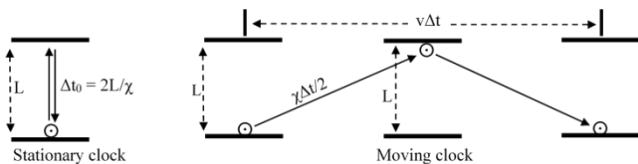

Figure 1

If we calculate the relativistic time elapses on the moving clock compared to the elapsed time on the stationary clock.

$$L^2 + \frac{v^2 \Delta t^2}{2^2} = \frac{\chi^2 \Delta t^2}{2^2} \tag{1}$$

$$L^2 = \Delta t^2 \left(\frac{\chi^2}{2^2} - \frac{v^2}{2^2} \right) \tag{2}$$

$$\Delta t^2 = \frac{2^2 L^2}{\chi^2 - v^2} \tag{3}$$

$$\Delta t = \sqrt{\frac{2^2 L^2}{\chi^2 - v^2}} = \frac{2L}{\chi \sqrt{1 - v^2 / \chi^2}} = \left(\frac{2L}{\chi} \right) \frac{1}{\sqrt{1 - v^2 / \chi^2}} \tag{4}$$

$$t = \Delta t_0 \frac{1}{\sqrt{1 - v^2 / \chi^2}} \tag{5}$$

The factor which discerns this from the Galilean transformation is

$$\frac{\Delta t}{\Delta t_0} = \frac{1}{\sqrt{1 - v^2 / \chi^2}} = \alpha \tag{6}$$

To find a mathematical formula that will relate the space and time let's think about three observers; one on a stationary land, the second one on a moving training with velocity v relative to the stationary observer, and the third person standing on the same train in the direction of the movement at the distance s at coordinate x' from the Nikola source which is in-front of the co-traveler, and there is another source of Nikola in front of the observer on the platform. when both the sources meet each other at the origin where $(t = 0, x = 0)$ and $(t' = 0, x' = 0)$ coincide, the source on train releases a Nikola particle at the moving direction at non-relative velocity χ and the source on the platform does the same in the opposite direction.
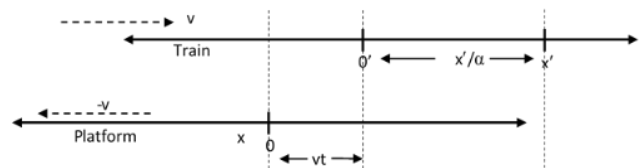

Figure 2

When the particle by the source on the train reaches the point s at the coordinate x' we try to find where is the point s from the perspective of platform observers' x-coordinate system at time t.

$$x = x'\alpha + vt \tag{7}$$

$$x' = \alpha (x - vt) \tag{8}$$

As we already know that the time at the origin is

$$t = t'_{origin} = 0 \tag{9}$$

Relative to the platform observer as the train is in motion, the time that elapses in the moving train will always be slower than the stationary time which is bigger by the factor α.

$$t = \alpha(t'_{origin}) \tag{10}$$

We are also aware that as the train is in motion, the time of the person standing on the train at point s in coordinate x' will be slower than the time of the person standing at the origin of x'.

$$t'_{x'} = t'_{origin} - \frac{vx'}{\chi 2} \tag{11}$$

$$t'_{origin} = t'_{x'} + \frac{vx'}{\chi 2} \tag{12}$$

$$t = \alpha \left(t' + \frac{vx'}{\chi 2}\right) \tag{13}$$

As the observer at the origin of the train can claim that he's at rest and the person on the platform is on the movement we can use the same equation by interchanging the rows of platform and train as below.

$$t' = \alpha \left(t - \frac{vx'}{\chi 2}\right) \tag{14}$$

For the sake of argument, I would like to consider equations 4 and 6 as my equations of transformation.
Imagine that you and a horse start to run from the origin where t and x equal 0, the horse runs at velocity w and you run towards it at velocity v, and I observe this event from a stationary platform without relative motion. According to me at time t you and the horse will be at distance as below:
Horse: (t, wt), and you: (t, vt). From your perspective, the horse will be

$$t' = \alpha \left(t - \frac{v}{\chi^2} wt\right) \tag{15}$$

$$x' = \alpha (wt - vt) = \alpha t (w - v) \tag{16}$$

and from your perception, the speed of the horse will be

$$w = \frac{x'}{t'} = \frac{w-v}{\left(1 - \frac{vw}{\chi^2}\right)} \tag{17}$$

this is the relativistic velocity combination equation when only the x coordinate is involved. And the equations for y and z coordinates will be

$$w_y = \frac{w_y}{\left(1 - \frac{vw_x}{\chi^2}\right)} \tag{18}$$

$$w_z = \frac{w_z}{\left(1 - \frac{vw_x}{\chi^2}\right)} \tag{19}$$

As I go further using the same method, I can get the equations of relativistic velocity, and equivalence of energy and mass as below.

$$m = \frac{m_0}{\sqrt{1 - \frac{v^2}{\chi^2}}} \tag{20}$$

and

$$E = m\chi 2 \tag{21}$$

The pivotal understanding from the discussions above is, the speed of the light came into the picture of these equations because only since we make the equation to find the velocity of the light. But by generalizing those equations for all the velocities, we, fortunately, force the velocities of everything within this universe to be less than the speed of light as it's obvious from the discussions above. Just to make it clearer imagine if I had taken some particle that travels slower than the speed of the light into account when I derived the above equations, the speed of the light will be forced mathematically to be less than the velocity of that particle or something higher than the speed of the light such as tachyon, it would allow the things in the universe to travel faster than the speed on the light. And by doing so the constancy of the speed of the light will be disproved for the sake of the argument.
In order to prove it, just imagine that I stand on a stationary platform in front of the Nikola source and you are passing by me at velocity v by a spaceship. when both our frames are meeting at the origin, a Nikola particle being released out. And when the particle reaches the location $x = \chi t$, we have to find when and where this event happens from your perspective. The stationary perspective:

$$(t_0, x_0) = (0,0); \quad (t_1, x_1) = (t, \chi t) \tag{22}$$

Spaceship perspective

$$t'_1 = \alpha \left(t - \frac{v\chi t}{\chi 2}\right) \tag{23}$$

$$x'_1 = \alpha (\chi t - vt) \tag{24}$$

Based on these, according to the observers in the spaceship, the velocity of the Nekota particle will be

$$V = \frac{\chi - v}{\left(1 - \frac{V}{\chi}\right)} = \chi \tag{25}$$

using these transformation equations if I had tried to find the speed of the light from the perspective of the observers in the spaceship, the result would have been as below

$$c = \frac{c-v}{\left(1 - \frac{vc}{\chi 2}\right)} \tag{26}$$

which makes the speed of the light to be relative to the motion of the observers. From all of our above discussions, it is being clear to us that the entire issue of the special theory of relativity being originated from the Lorentz factor.
To bring my argument a step further imagine that I kicked a football into a wall. It hit the wall and bounced back. Now according to the special theory of relativity, the time elapsed on the ball should be slower than mine. As the time of the ball is slower than mine, the ball should be left in my past, which

means I should/ not be able to see that ball in my present since it is still in my past. But as I see the ball in my present, the time of the moving ball was not slower than mine. Therefore, there is no time dilation due to the relative motion.

Let's take into account an experiment, believed to be practical evidence of time dilation. Hafele-Keating experiment in which four cesium atomic clocks were flown on commercial flights around the world twice, once eastward and once westward, to test Einstein's theory of relativity (Hafele & Keating, 1972). Try to have a logical look at this experiment. If the time of each flight was different from the other and the times of both flights were different from the time on earth, none of them would have been able to meet in the present of the earth. Because to be frank we are not talking about something called clock dilation, but time dilation. If it was true why it's only shown in the clocks, not in the reality. Strictly speaking, this experiment arises a strong suspicion, but the objection against the accuracy of the clocks in motion.

Instead of trying to prove the relativity with this experiment, I suggest if we can spend some time creating a clock that will not mislead us even when in motion, would be worth for us. 'A reliable clock though in motion' could be the next revolution in the clock manufacturing industry.

The idea of time dilation with relative motion opens the gate for the belief in time travel. And the concept of time travel takes me into some philosophical arguments. i.e., if I am in my present right now, and there are trillions of 'I's in my past and future, what will happen to the 'I' was in my next yoctosecond when that yoctosecond becomes my present? What will happen to the 'I' was in my last second of my life when I pass one more second of my present? If that 'I' dies how I am alive in my present and who I will be then? The 'I's in my past have less experience than me and the 'I's in the future have more. So, they cannot be me, if they are not me, I do not exist in my past or future. Same the way everything in my present does not exist in past or future since all are in the same present. Therefore, no one can time travel into their past or future.

Hypothetically if we accept that I am there in all my past, present, and future, that would be a self-contradicting belief. i.e., how was I dying even before I ever be born; would be given birth even since before my parents met each other even since before they were born; would be alive even when I die in my present.

Perhaps, I can take this argument into a different philosophical phase as well. i.e., if you say all 'I's in my past, present, and future are the same; who is real? What is the key to personal identity? If you say that the experience is the key, just a while ago I have proved that none of them have the same experience as I have, or if you say it is the body or the soul, can they be cloned or duplicated, if so, who is the factual 'I'?

As a concomitant of the special theory of relativity, we mathematically accept that the past, present, and future are invariably there. This logically means that my future is predefined, which time I will go to bed tonight; where I will sleep; what color cloth I will wear tomorrow; whom I will meet my next day, and what will I discuss with them. Each and everything in my life is predefined; second by second, minute by minute. A strong objection against free will arises from this

concept. Therefore, I would like to throw an essential question, i.e., who defined my future in such an irrevocable manner?

After all, these logically constructed arguments and explanations still if there is someone who could not understand this, I would like to suggest a practical experiment. i.e., board a prolonged train. Measure the length of the train from inside when it is stationary relative to the observers from outside the train with a precise digital measuring device that can display even slight changes in the length. And then let the train move in non-constant speed, and keep in measuring the length in every phase whether the device reads changes in the length or not. At least I hope no one will come up with any mathematical equations to argue that the digital programming of the devices also will be changed relative to the motion.

The time does not need to be dilated; the length to be contacted in order to make the speed of the light constant. If we truly understand the concept of energy; the type of energy causes the light for its velocity, and the type of energy causes the velocity of other objects we relatively observe. The light has a constant velocity because it is the internal energy of the photon, which does not experience relative changes in it (Khan, 2020).

The perspicuous understanding of the facts of nature and the enervations of the special theory of relativity, allows us to accept the reality that matter and particles can travel faster than the speed of the light such as the velocity of the expanding universe. Thus, the concept of time traveling remains to be science fiction.

Upon the unacceptability of the Lorentz transformation, the gape would be replaced by the Galilean transformation. but only for the motions caused by the external energy, since only that could be relative (Khan, 2020). As c is not the external energy of the photon, the noncompliance of the speed of light to the proposed equation will not affect the accuracy of the Galilean transformation.

THE RELATIVITY OF SIMULTANEITY

Envision a train with a light source in the exact center of it, which means when the light from the source being released, it reaches both the ends (A, and B) at a meticulous time.
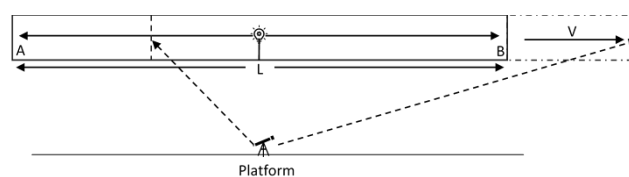

Figure 3

Let's now consider that the train is in motion to the right at constant velocity v relative to the observer from a stationary platform.

As the train is in continuous motion, from the perspective of the stationary observer; the light has to travel more distance to the right compared to the left side of the train. Therefore, the light would take a longer time to arrive at B compared to A.

$$time = \frac{distance}{speed} \qquad (27)$$

$$t_B = \frac{\left(\frac{L}{2}+vt_B\right)}{c} \qquad (28)$$

or

$$t_B = \frac{L}{2(c-v)} \qquad (29)$$

As A moves towards the light, the time to reach A would be

$$t_A = \frac{L}{2(c+v)} \qquad (30)$$

As the time difference between A and B will be

$$t_C = t_B - t_A \qquad (31)$$

$$t_C = \frac{L}{2(c-v)} - \frac{L}{2(c+v)} \qquad (32)$$

$$t_C = \frac{L}{2}\left(\frac{1}{c-v} - \frac{1}{c+v}\right) \qquad (33)$$

$$t_C = \frac{L}{2}\left(\frac{(c+v)-(c-v)}{(c+v)(c-v)}\right) = \frac{L}{2}\left(\frac{2v}{c^2-v^2}\right) \qquad (34)$$

$$t_C = \frac{Lv}{c^2-v^2} \qquad (35)$$

The above steps of the thought experiment prove the relativity of simultaneity mathematically(Morin, 2008). But let's step back at this point and look into it from a different perspective.
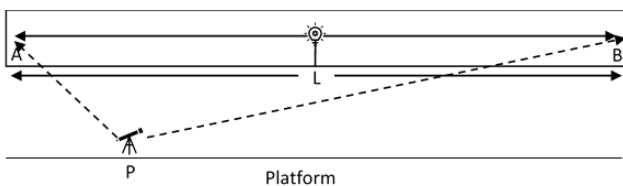

Figure 4

Imagine that both the train and the platform observers are stationary relative to each other. But the platform observer stands at a closer distance from point A relative to point B. Though the light travels starting from the source and arrive both the end at the very same time, the observer at point P will assume them not to be simultaneous as the light from point B has to travel longer than from point A. understanding of this essential fact, will help us solve the puzzle of the relativity of simultaneity.

If we say that x was caused by z, the x should not exist in the absence of z. if not z could not be the cause of x. e.g., if we say that the light is the cause of brightness in a room, to make this statement true the brightness should not exist when we switch the light off, otherwise, the statement would be wrong. But as the brightness disappears as the light turned off, we can conclude the credibility of that statement. Perhaps someone could commit mistakes in reasoning because of some gaps in understanding. e.g., someone says that the fire is the cause of cooking rice. But look at the rice cooker, which also cooks the rice, but without fire. Therefore, the first reasoning would be wrong since he failed to notice the heat in the fire which is the real cause as they are accompanied by each other. With the same logic, if we reconsider both the examples above in the talk of the relativity of simultaneity, we could notice the motion accompanied by the change in observational points from both ends of the train. And in the second situation only the change between the distance of observational points; is taking place. But still, we notice the differences between the durations, the light takes to reach both the ends relative to the platform observer.

Therefore, the relative velocities cannot be reasoned for the relativity of simultaneity. And this relativistic phenomenon just occurred due to the changes in the observational point. Strictly, it is called a mere optical illusion. And the illusion has nothing to do with the occurrence of the real event; if they take place simultaneously, the event is just simultaneous regardless of motions or perspectives of the relative observers. And we just have to post-process that to realize the fact.

PARADOXES OF SPECIAL RELATIVITY

Over the past century, there was plenty of changes against the special theory of relativity with the succor of some phosphorescent paradoxes such as ladder paradox, rod and grate paradox, and so forth. But unexpectedly, they were comprehended imprecisely and were pretended as all those paradoxes are puzzled out. However, lamentably it had been done with some non-sophistic explanations.

Strictly speaking, I can build up my arguments based on the responses were given to those paradoxes. But I apprehend that my explanations also will take someone into a delusion and make them come up with some misleading responses. Therefore, I choose to place my arguments with four different paradoxes which can nimbly controvert all four basic teachings of special relativity; relativistic observation, length contraction, time dilation, and relativistic mass.

1. Envisage two identical balls; A and B. A is suspended under a roof or in space, and B is traveling towards A in uniform velocity v. when B hits A; A should move backward and B forward according to the suspended ball. But as special relativity comes into account, from the perspective of B, it is stationery and A is the one in motion. Therefore, when it is hit, it should move backward and A forward. How these two self-contradicting events can occur as a consequence of a single incident! Perhaps, based on this experiment, we can prove that only one of those two perspectives can eventuate. Thereon the relativistic perspective of B would be proved just to be a falsifying illusion.

2. We have two analogous magic sticks; x and x', which have a width of 1 m. The specialty of these sticks is, no force in this universe can break them when their width is exactly 1 m. But only a magic stick with the perfect condition can shatter them when their width becomes smaller than 1 m. A scientist who has expertise in the special theory of relativity separated both the magic sticks with the distance d. Then he set the stick x' into motion towards x with constant velocity.$7c$.
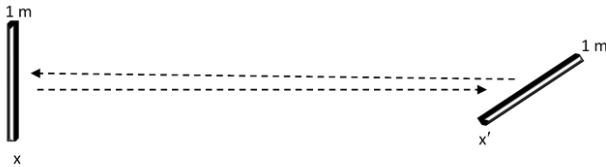

Figure 5

According to the special theory of relativity, the width of the x' will be

$$l = l_0 \sqrt{1 - \frac{v^2}{c^2}} = 1\sqrt{1 - \frac{0.7^2}{1^2}} = l = 0.7141 \, m \tag{36}$$

Therefore, when both the sticks hit each other, the x′ would be broken by x from the perspective of x. But based on special relativity, from the perspective of x'; x is in motion. so that, x would be broken by x'. Which stick will be broken by which?

3. Alpha and Delta live in a fancy universe where all inhabitance dies as they complete the age 40. The distance between their planets is 12 light-years. When both of them were at the age of 28, Bob started to travel in a spaceship at constant velocity 12/13c towards the planet of Alex. As special relativity is concerned the factor gamma γ will come into the picture.

$$\gamma = \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}} = \gamma = 1\sqrt{1 - \left(\frac{12}{13}\right)^2} = \frac{13}{5} \tag{37}$$

According to Alex, as Bob is in motion, the distance he has to cross would be as 12 ly = (5/13)×12.
The time Bob will take to reach him will be (60/13) ly/(12/13)=5 years. And Alex clock would be

$$\Delta t' = \frac{\Delta t}{\sqrt{1 - (^v/_c)^2}} = 13 \text{ years} \tag{38}$$

Therefore, when they meet each other from the perspective of Alex, he will be entered into the age 41 and Bob at 33. This means to say, based on the nature of their fantasy universe,

relative to Alex, he would be dead before he meets Bob. This circumstance will be antipode under the relativity of Bob. Whose perspective is correct, who is alive and who is dead?

4. Imagine a magic cage that has a mass of 10 kg. The cage always travels at a content velocity of $0.6 \, c$. As it travels when the mass exceeds 199 kgs; the cage teleports from milk way to Andromeda galaxy. People have a mass of more than $120 \, Kg$ were not permitted to enter the magic cage and no items could be taken with, and the personals who have $120 \, kg$ mass, were not able to hit the targeted mass.

$$m = m_0\gamma = 130 \times 1.249 = 161.2 \, kg \tag{39}$$

Therefore, no one could experience teleportation from the milky way galaxy. But one day, a wise man came to know about this cage and the rules, he claimed that he can make it happen. But everybody mocked him. Because he was only 110 kg and even those who were heavier than him, could not achieve it. But somehow the challenge was accepted. Surprisingly, the man came with his son who has a mass of 40 kg, and both of them entered the cage. No one could object to him on what he was doing as there were no restrictions on how many people should enter at once. Eventually, all the observers were happy. $m = 199.84$

As the total relativistic mass of the cage hit the target, all the observers were able to see real-life teleportation in front of their eyes. But now, relativity comes into account. The man and his son claim that they are stationary and everything else is rushing by them. So, the mass of the cage was not able to exceed 160 kg. therefore, they were not able to experience teleportation. Who is correct here? Were they teleported or not?

CONCLUSION

The entire special theory of relativity was based, unfortunately, on the illusion of the Lorentz factor. The acceptance of the speed of light in the equation without questioning the necessity of it, caused physics to travel into a fictional world for more than a century. As it proved by the derivation of an alternative transformation equation.
By the concurrence with the proposals of special relativity, we must encounter some practical and philosophical objections as raised above, i.e., if someone hit a ball into a wall, and the time of the ball runs slower than the person who is relatively stationary, how the person could see the ball in his present while it is stuck in his past? if I am in my present right now, and there are trillions of 'I's in my past and future, What will happen to the 'I' was in my last second of my life when I pass one more second of my life? If that 'I' dies how I am alive in my present and who I will be then?
The critique approach of the facts of nature and the enervations of the special theory of relativity, reveals the reality that matter and particles can travel faster than the speed of light such as the velocity of the expanding universe. Therefore, the concept of time traveling remains to be science fiction.

Since the paradoxes and the discussions above proved the inexactness of the concepts of length contraction, time dilation, and relativistic mass, the ideology of relativistic changes in the internal energy has no proof to be built upon. Therefore, the speed of the light is constant as it is the internal energy of the photon and does not experience any relativistic changes in it.

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