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ABSTRACT

The theory of relativity has been at the pinnacle of human scientific thought for 120 years. However, whether it should continue to lead is a question for us. Voices questioning the theory of relativity have been continuing, but since they are mostly from a mathematical or experimental point of view, they have not yielded convincing results. We have pioneered a new way of analyzing mathematical models from the perspective of reviewing the rationality of physical models, thus we have seen many problems with relativistic models from different perspectives, which we have grouped into three general concerns and 12 obvious or easy to prove problems. Through these intuitive discussions, we believe that the theory of relativity should no longer lead the scientific and technological thinking of mankind. This article focuses on special relativity. We will continue to discuss general relativity in future articles.

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I. INTRODUCTION

The theory of relativity put Einstein on the altar of science. For 120 years, people also have been questioning the theory of relativity, but to no avail. The reason is that people always question it by mathematics or experiments, which is of no much effect.

Pioneering from the perspective of an application engineer, we saw that Einstein did not correctly and strictly define those physical models like design a precise engineering project, and thus could not use those models correctly according to his own intentions. Therefore, when he used those models, there were already full of loopholes in his applications.

This made us believe that the theory of relativity should no longer lead the scientific thinking of mankind.

This article is a critique of Einstein's special theory of relativity. Therefore, it first describes three key points that need to be concerned in the systems of special theory of relativity. Then, 12 problems of the special theory of relativity were analyzed.

1.1 Three General Concerns

In general, in Einstein's theory of relativity, he did not clearly point out the application restrictions between two reference bodies. This led to many general application problems. Three major concerns are listed below, because of their absence the relative system makes the relativistic application lack a scientific basis, especially when the three are used in combination.

First concern

Theory of relativity does not specify the distance between the two reference bodies. If a clock on the airplane can be relative to the ground clock, then the American flag pole on the moon should be able to be relative to a light beam on the Earth. If the distance between the two reference bodies is more than one light year, the length change or clock slow down would still happen?

Second concern

The theory of relativity does not specify the quality of a reference body. If a moving alloy rod has a diameter of 1000 meters, a ray flies back and forth over the moving rod, will the rod become shorter?

Third concern

The model of the light ray and the rigid rod does not explain how the two reference bodies are

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bound to each other? How do they form a relative system?

Assuming there are 100 rigid rods, how could Einstein make his ray form a relative system with the No.4 rigid rod he wanted to be relative to? Is there any way to bind his ray and No.4 rod to each other so that they can be relative without disturbed by other rods?

For another example, in the experiment of a clock on the airplane and a ground navy clock, how does the airplane clock know it should be relative to the navy clock? Does the airplane clock also be relative to the clocks on space shuttles, on trains, or on cars......?

This relative situation in which the objects join the relative system automatically without knowing by the experimenter's mind is called Passive Relative. Due to the unscientific system design of Einstein's physical model, the Passive Relative is unavoidable.

B. 12 Problems

We listed 12 problems about the special theory of relativity from Einstein's paper [1] and book [3] below. It will follow the following format: In each problem, Einstein's quotation corresponding to the discussing problem is extracted from Einstein's paper [1] or book [3] into the problem. Then, "what is wrong" is discussed and analyzed through this problem, and the key concern in the problem is pointed out.

Problem 1

There are several problems associated with Einstein's Quotation-1 from Section VII of [3]: "*Let us suppose our old friend the railway carriage to be travelling along the rails with a constant velocity v, and that a man traverses the length of the carriage in the direction of travel with a velocity w. How quickly or, in other words, with what velocity W does the man advance relative to the embankment during the process?*"

https://www.gutenberg.org/files/5001/5001-h/5001-h.htm#ch6

Using the "man-carriage-embankment" system in above Quotation-1, together with following Quotation-2, we prove that the synchronous transmission rule given by Einstein is an obvious error, and is not a "universally valid" rule.

From "§1. Definition of simultaneity" of [1], Einstein's Quotation-2 is such:

"*Suppose a ray of light leaves from A toward B at "A time" t_A, is reflected from B toward A at "B-time" t_B, and arrives back at A at "A-time" t'_A, The two clocks are synchronous by definition if*

$$t_B - t_A = t'_A - t_B.$$

We assume that it is possible for this definition of synchronism to be free from contradictions, and to be so for arbitrarily many points, and that the following relations are therefore generally valid:

1. *If the clock is B is synchronous with the clock in A, then the clock in A is synchronous.*
2. *If the clock in A is synchronous with the clock in B as well as with the clock in C, then the clocks in B and C are also synchronous relative to each other.*

https://einsteinpapers.press.princeton.edu/vol2-trans/156

To easily refer to, we label Einstein's above formula as (1) shown below, since formula (1) will be used from beginning to the end in this paper.

$$t_B - t_A = t'_A - t_B. \tag{1}$$

Now, we take the carriage as A, the man as B, and the embankment as C. Then, according to (1):
A and B are synchronous, that is, the carriage and the man are synchronous.

A and C are also synchronous, that is, the carriage and the embankment are synchronous.

But B and C are not synchronous. That is, the man and the embankment are not synchronous. Because the speed of the man relative to the embankment is (the speed of the man + the speed of the carriage), the back-and-forth speed is not equal. The back and forth times are different, which violates (1).

This is to say item 2 in Quotation-2 is wrong.

Problem 2

The following is an exactly same error as Problem 1. We take Footnote of Section VIII of [3] as Einstein's Quotation-3:

"*We suppose further that, when three events A, B and C take place in different places in such a manner that, if A is simultaneous with B, and B is simultaneous with C (simultaneous in the sense of the above definition), then the criterion for the simultaneity of the pair of events A, C is also satisfied. This assumption is a physical hypothesis about the law of propagation of light; it must certainly be fulfilled if we are to maintain the law of the constancy of the velocity of light in vacuo.*"https://www.gutenberg.org/files/5001/5001-h/5001-h.htm#ch8

In Quotation-3, Einstein defined a *simultaneity* transmission rule. The meaning of two events simultaneously is that they satisfy (1). Using the same method and steps as the proof in *Problem 1*, we can prove that the simultaneity transmission rule defined by Einstein is also wrong.

In simple terms, let the moving carriage in Einstein's Quotation-1 be B, the moving man in the carriage be A, and the embankment be C. Then, A and B meet (1) so they are simultaneous, and B is simultaneous with C; but A is not simultaneous with C.

Problem 3

The last sentence of Quotation-3 also leads to a serious problem. Einstein said that if this simultaneity transfer assumption is not fulfilled, then the law of the constancy of the velocity of light in vacuo is not held. Now according to our proof in above Problem-2, the simultaneity transfer assumption is really not fulfilled. How should we handle Einstein's law of the constancy of the velocity of light in vacuo?

Problem 4

One of the problems in Quotation-1 is: Since the composite of the man-and-carriage moves relative to the embankment, then, let's assume that there are two points A and B on the embankment that are far apart. According to (1), we need to calculate the time required for the composite speed of the man-and- carriage to move back and forth between A and B. Assume that the train is heading from A to B. Then, when the man moves from B to A in the opposite direction of the carriage, W = w - v. Since the man's speed w is much smaller than the running speed v of the carriage, so w - v < 0, means the man will only move further and further away from point A and will never reach point A. Therefore, the result of the calculation using (1) is $t'_A - t_B = -$ infinity. Or we can say that the man-and-carriage complex only moves in the direction of the train's movement, and has no movement against the direction of the train's movement. This is a situation not handled within Einstein's theory. It can be seen from this that the physical model of man-and-carriage relative to the embankment given by Einstein in Quotation-1 is not a model of relativity, and should not be used to discuss relativity at all.

Problem 5

Another problem in Quotation-1 is that the physical model in this passage is that a man is walking in a moving carriage, but the man is required to be a reference body relative to the embankment, while the embankment is another reference body. The problem is that the speed W of the man moving relative to the embankment is the combination of the man's speed w and the carriage's speed v. The man and the carriage are together formed a reference body in the relative system, and the embankment is another reference body. Then, W is the speed of the reference body composed of the man-and-carriage. The back-and-forth speeds of W are different (coming: W = w + v; going: W = w - v), which violates the regulations of the qualified reference body that must have uniform speed stipulated by Einstein. Therefore, the composite of the man-and- carriage cannot be used as a reference body in Einstein's theory of relativity. In other words, Einstein widely used this unqualified composite object as a reference body in his book [3] to discuss his theory of relativity.

Someone may ask: Einstein uses such a pattern in many places. For example, in "§2. On the relativity of lengths and times" of [1], Quotation-4 says:

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

$$t_B - t_A = \frac{r_{AB}}{c - v} \text{ and } t'_A - t_B = \frac{r_{AB}}{c + v}$$

where r_{AB} denotes the length of the moving rod—measured in the stationary system. Observers moving with the moving rod would thus find that the two clocks were not synchronous, while observers in the stationary system would declare the clocks to be synchronous.

https://einsteinpapers.press.princeton.edu/vol2-trans/159

The time calculation formula used is labeled as (2) as following for later reference:

$$t_B - t_A = \frac{r_{AB}}{c - v} \text{ and } t'_A - t_B = \frac{r_{AB}}{c + v} \qquad (2)$$

Then, doesn't formula (2) also mean that the speed of light does not meet the requirement that the reference body must move at a uniform speed? Because the speeds go back and forth in (2) look like (c – v) and (c + v), they are different, just like (w - v) and (w + v). Many of such patterns discussed by Einstein, like lightning striking from both ends of the carriage, or the raven flying over the carriage, are all the same pattern. Are they all wrong?

The answer is: None of them are wrong. In all of the works of Einstein that we know of, only this system model of man-and-carriage, and embankment that Einstein used extensively in [3] is wrong!

Regarding this question, please see the detailed discussion about the speed of light below. In Problem 7 we will give an answer to it. This is a difficult question. Try first to see if you can answer it.

Problem 6

Einstein emphasized the constancy speed of light in [4]. But in his work, there are contradictory statements.

In the second paragraph at the beginning of [1], Einstein emphasized the principle of the constancy of the speed of light. In the following §1, he said four times that the speed of light in a vacuum is constant and has nothing to do with the motion state of the observer or the light source.

However, in [1] and [3], his writing repeatedly violated this principle set by himself.

Quotation-5 is from "§4. The physical meaning of the equations obtained concerning moving rigid bodies and moving clocks" of [1]:

An analogous consideration—applied to the axes of Y and Z—it being borne in mind that light is always propagated along these axes, when viewed from the stationary system, with the velocity $\sqrt{(c^2 - v^2)}$ *gives us*

$$\partial\tau/\partial y = 0, \partial\tau/\partial z = 0.$$

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Here Einstein calculated that "*light is always propagated along these axes, when viewed from the stationary system, with the velocity* $\sqrt{(c^2 - v^2)}$ *......*"

Problem 7

Quotation-6 is From Section VII of [3]:

"w is the required velocity of light with respect to the carriage, and we have w = c – v.
The velocity of propagation of a ray of light relative to the carriage thus comes out smaller than c."

The above description obviously violates "the constancy of the velocity of light in vacuo." At the end of §2 in [1], a similar problem with the speed of light also appears.

This problem is not a big deal and can be corrected by the following calculation. Since the speed of light is constant, we cannot say that w is the speed of light relative to the carriage w = c – v. The speed of light is constant and has nothing to do with the motion state of the observer or the light source. The correct statement should be follows:

The speed of light is completely independent and will not be affected by anything. Suppose the time required for light to travel the length L of the carriage in the stationary system is T. When light at the speed of light travels from point B through the length of the moving carriage L, and arrives the original position of point A, but point A has already moved forward a certain distance at the speed v. The light needs more time to catch up to A. So, the total used time is bigger than T. Similarly, the total time required for light to reach B from A is slightly less than T.

Thus, the back-and-forth times the light used to travel moving distance L in different directions are not the same, and do not satisfy (1).

In this way, we have proved that (1) does not hold in this model, as Einstein wanted to prove; and we have also correctly explained the problem that the speed of light in (2) has not changed. In our proof, the speed of light is always constant, and it is the movement of another reference body - the carriage, that makes (1) not hold. Moreover, the speed v of the reference body (here is carriage) is always uniform, and the carriage can be used as another reference body in the relative system. Therefore, this is a qualified relative system.

This also answers the question that the reader was asked to think about at the end of Problem-5 before reading this section.

In the relative systems composed of light, lightning, flying raven, etc., which Einstein often used, each of them is completely independent to another reference body. In Einstein's theory of relativity, each of them is not affected by another reference body in the system and exists independently with a uniform speed.

Problem 8

Einstein's physical models often fail to take into account the application conditions, leading to various errors. Here is an example.

In Section V of [3] Einstein gave us a new protagonist raven in Quotation-**7** below:

Let us imagine a raven flying through the air in such a manner that its motion, as observed from the embankment, is uniform and in a straight line. If we were to observe the flying raven from the moving railway carriage, we would find that the motion of the raven would be one of different velocity and direction, but that it would still be uniform and in a straight line.
https://www.gutenberg.org/files/5001/5001-h/5001-h.htm#ch6

But there are obvious problems with the physical mode. The raven is different from the light beam in the relative system because their speeds are very different.

When two moving reference bodies are independent of each other, the relative system composed of them cannot maintain synchronization. In addition, it has certain requirements for the reference bodies. The raven flying over the carriage is independent of the carriage. Because the raven's speed is smaller than the speed of the carriage, the raven can never catch up to the other end of the carriage, and there is no way of using it as a reference body to form a relative system. The mathematical model abstracted from this physical model is completely invalid since it cannot use formula (1).

Problem 9

Using Einstein's theory to wipe out any enemy.

First, Einstein said in following Quotation-8 from section XVIII of [3]:

If we formulate the general laws of nature as they are obtained from experience, by making use of

(a) the embankment as reference-body,
(b) the railway carriage as reference-body,

then these general laws of nature (e.g. the laws of mechanics or the law of the propagation of light in vacuo) have exactly the same form in both cases.......

As long as it is moving uniformly, the occupant of the carriage is not sensible of its motion, and it is for this reason that he can unreluctantly interpret the facts of the case as indicating that the carriage is at rest, but the embankment in motion. Moreover, according to the special *principle of relativity, this interpretation is quite justified also from a physical point of view.* https://www.gutenberg.org/files/5001/5001-h/5001-h.htm#ch18

Quotation-8 describes the relative meaning between two reference bodies in a relative system. Everything in Quotation-8 seems perfect. But if we replace the protagonists with "a light beam" and "an enemy," who is staying in a position or moving at a uniform speed, and replace the carriage with a light beam, and replace the embankment with the enemy. Now let the light and the enemy form a relative system.

What will happen after the replacement?

Using the model of above Quotation-8, the light is not moving, instead the enemy is moving with the speed of light.

In the case of the matter (enemy) as m moving at the speed of the light, according to Einstein's theory $E = mC^2$, the enemy is converted into energy E. He is wiped out, and exists as energy.

Einstein said in *Quotation-9*: *"It is clear that the same results hold good for bodies at rest in the "stationary" system, viewed from a system in uniform motion.*

So, using a light beam to be one reference-body, the enemy be another reference-body; by applying Quotation-8, we can easily and remotely wipe out any enemy.

If we can't wipe out the enemy, it means somehow the theory is wrong.

Problem 10

Quotation-9 is from § 4. Physical Meaning of the Equations Obtained in Respect to Moving Rigid Bodies and Moving Clocks of [1]: *the X dimension appears shortened in the ratio 1: $\sqrt{(1 - v^2/c^2)}$, i.e. the greater the value of v, the greater the shortening. For v = c all moving objects—viewed from the "stationary" system—shrivel up into plane figures...*

It is clear that the same results hold good for bodies at rest in the "stationary" system, viewed from a system in uniform motion.

...the travel clock on its arrival at A will be 1/2 $t(v/c)^2$ second slow," and *"a balance-clock at the equator must go more slowly..."*
https://einsteinpapers.press.princeton.edu/vol2-trans/166

In Quotation-9 Einstein discussed the physical meaning of the equations obtained for a moving rigid body and a moving clock.

In whole §4 of [1], there is no other physical or matter content except coordinate motion and transformation. That is a pure mathematics section. But playing the pure mathematic, using the motion of the reference bodies, Einstein concluded that the moving length be shortened *in the ratio 1: $\sqrt{(1 - v^2/c^2)}$*, and *the travelled clock will be 1/2 t $(v/c)^2$ second slow,"* and *"a balance-clock at the equator must go more slowly."*

If we take two beams of light with the same conditions but moving in completely opposite directions, and make them be relative to the same one rigid rod at the same time, what will be the result?

Can a moving diamond rod become shorter by relative motion?

We cannot prevent moving objects in the world passively relative to Einstein's moving rod. We also cannot prevent moving clocks in the airplanes, in the running trains...., be passively relative to Einstein's clock at any location.

We want to ask: Does the §4 of [1] mean that as long as the mathematics is beautiful, the application can be arbitrary? Will the material world be changed according to pure mathematical inference or calculation?

Lorentz transformation is a theory about electromagnetic fields. Can it be extended to rigid rods, carriages, and other matters at will?

Problem 11

The Quotation-10 in Section VII of [3] Einstein says

"since *the ray of light plays the part of the man walking along relatively to the carriage. The* *velocity W of the man relative to the embankment is here replaced by the velocity of light relative to the embankment.*" This sentence is incorrect. The "light relative to the *embankment* " and "the man relative to the *embankment* " are two completely different modes.

The light and the carriage are independent, so their speeds cannot be superimposed! The light relative to the embankment is also good to form a static relative system.

But for the man walking in a moving carriage, his speed and the carriage's speed must be superimposed. (1) is hold in the relative system they composed. But the motion of the man can't form a relative system with the embankment, which we discussed in Problem-4 and Problem-5. More importantly, it damaged Einstein's conclusion that "absolute simultaneity does not exist." We continue discussing this below.

Problem 12

Einstein emphasized the *relativity of simultaneity* and rejected absolute simultaneity in the theory of relativity. It seems that if there is absolute simultaneity, the whole relative system will crash. Quotation-11 below are the stories about definition of simultaneity.

a) From [5]: *That is why the theory of relativity rejects the concept of absolute simultaneity, absolute speed, absolute acceleration, etc., they can have no unequivocal link with experiences.*
b) From [1], after eighteen years, Two key words [*"simultaneous," or*] were added into this paragraph: *Thus with the help of certain imaginary physical experiments we have settled what is to be understood by synchronous stationary clocks located at different places, and have evidently obtained a definition of "simultaneous,"* or "synchronous" and *of "time."*
https://www.physics.umd.edu/courses/Phys606/spring_2011/einstein_electrodynamics_of_moving_bodies.pdf

c) From [2]: (This paragraph missing two key words *"simultaneous," or*) *With the help of some physical (thought) experiments, we have thus laid down what is to be understood by synchronous clocks at rest that are situated at different places, and have obviously obtained thereby a definition of "synchronous" and of "time."*
https://einsteinpapers.press.princeton.edu/vol2-trans/157

Then, what is simultaneity? How can a system be judged as a relativistic system with absolute simultaneity?

The title of §1 in [2] is "§1 Definition of simultaneity". However, it is strange that in this about 1,000-word paragraph of §1, readers cannot find the definition of simultaneity. There is only one sentence related to the definition of "simultaneity" in §1 of the paper (Quotation-2), but still readers have no way to figure out the precise meaning of simultaneity.

Instead, there is a formula defined as synchronous. In §1, "simultaneous" appears 5 times and "synchronous" appears 7 times. The precise definition of synchronous was given by the formula which we referred to as (2) in Problem 1. But people still don't have a clear definition of "simultaneous."

If we don't have a precise definition of anything, how can we comment on this thing?

So, Einstein set a trap for readers in §1: the title is "§1 Definition of Simultaneity", but he did not give a clear definition of it, instead he gave us a precise mathematical definition for "synchronous". Generally speaking, "simultaneity" is not equal to "synchronous".

This has trapped many people, and it is certain that many so-called "masters of theory of relativity" do not truly understand the theory of relativity.

This trap also protected Einstein's theory of relativity. Because people could not accurately understand the key concepts of relativity, they had to follow the so-called masters who "understood" relativity to support relativity. 18 years later, relativity theory had established its unshakable position, few people would still be interested in what Einstein's simultaneity was.

After eighteen years, the two key words were quietly added into his paper "On the Electrodynamics of Moving Bodies" by Einstein. This modified paper was included in the book "The Principle of Relativity" [1] which Einstein personally arranged to reprint in 1923. He quietly inserted two key words into this English version of the paper 18 years later. Thus, the definition of simultaneity became Quotation-11 b), made it clear that "simultaneity" and "synchronous" in Einstein's paper are the same!

However, in other languages besides English [6-8], the articles still do not contain these two keywords. Einstein's secret revision of the key points of his paper 18 years later is not a decent behavior.

Now we know simultaneity = synchronous, and synchronous has a precise definition by (1). Then we can judge if a relative system is an absolute simultaneity system or not. The judging rule should be:

If a relativistic system always meets (1), then it is an absolute simultaneity relativistic system.

We believe that relative systems satisfying absolute simultaneity exist according to equation (1). An obvious example is the system composed of railway embankment, train carriage, and a man, an old friend in Quotation-1 of [3] discussed above. Continue Problem 11, taking out the man and the train carriage to build up a relativistic system; taking out the man and the embankment to build up another relativistic system. Both relativistic systems maintain absolute simultaneity. Because even if observed from the moon, the systems composed of the man and the train carriage always satisfies the equation (1) – the back-and-forth time will always be the same.

According to Einstein's definitions on absolute and relative synchronous or simultaneity of a relative system, we can find that there are a large number of relative systems that maintain absolute simultaneity in reality, such as the raven walking back and forth on a running train, stewardess walking on flying plane..., their movement always satisfies equation (1), and they are all relative systems that maintain absolute simultaneity. And that's why a sprinter doesn't need to consider running in the same or different direction of the Earth's rotation.

The existence of the absolute simultaneity relative system damaged and negated Einstein's theory of relativity.

III. RESULTS

Since Einstein did not attach importance to the physical model used to abstract out the mathematical model, from the perspective of the rationality of the physical model, the special theory of relativity has various theoretical defects; due to the lack of rigor in Einstein's theory and writing, there are many self-contradictory and unjustifiable statements in his paper and monograph as we listed.

IV. DISCUSSION

Over the past century, under the influence of Einstein, the academic world has been filled with an atmosphere of mathematical supremacy, and Einstein's theory of relativity seems to be.

Starting from analyzing the rationality of the physical model and then discussing the mathematical model derived from it can ensure the rationality of the mathematical model, especially in analyzing the relativistic model that is closely integrated with the application. This also applies to analyzing the mathematical model of general relativity.

V. CONCLUSIONS

Summarizing all problems above, we would like to ask: is the theory of special relativity worth to be the top scientific holy object to continue leading the scientific thinking for another 120 years and more? The answer is negative.

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