

Reply on “Critical comment on the paper “Some of the complexities in the special theory of relativity: new paradoxes””

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ABSTRACT

Some difficult moments of our previous article are additionally explained. Detailed critical analysis of "Critical Comment" is presented.

Keywords

Time dilation; length contraction; logical contradictions; Lorentz transformations; the notion of relativity

PACS: 03.30.+p;

I. INTRODUCTION

We will analyze in detail what the respected commentator wrote (see V.A. Leus, Critical comment on the paper “Some of the complexities in the special relativity: new paradoxes”, Physical Science International Journal 12(1): 1-5, 2016, Article no.PSIJ.28188). Along the way we will have to give some additional explanations to our article [1]. Let's start with the commentator's abstract. Firstly, the absolutely all key formulas of the special relativity theory (SRT) were received before its creation on the basis of quite different principles [4]. The SRT brought only its strange interpretations. Therefore, the theoretical manipulations with the formulas did not prove faithful of the SRT at all. Secondly, to test the SRT, modern humanity cannot yet create two inertial systems that move relative to each other with relativistic velocities. The particles in accelerators are not in an inertial system, since they are experiencing action of fields and forces of huge value; and to look at our world from that system is not feasible. Mesons are also formed at any altitude in the streams of particles from outer space, including flows of secondary particles. Thus, any experimental confirmation of strange interpretations of the SRT is also absent. Therefore, the very first sentence of commentator's abstract looks like unsubstantiated advertising or personal faith of the commentator.

The subsequent two sentences of the abstract say that the commentator simply is not familiar with the many thousands of critical works [2-16].

The first paragraph of the Introduction is dedicated to the propaganda of the well-known pseudo-explanation for the conventional twin paradox. It is clear again that the commentator is familiar only with the relativistic apologetics; he did not carefully read our article and did not read the other well-known works [5, 12, 15 and others].

It is worth noting that Commentary has some non-consecutive character (Pro and con, "and to your and to our" - who will win: SRT apologetics is presented everywhere, except small piece of own commentator's critical article with triplet paradox). So, commentator dedicated the second paragraph of the Introduction to the propaganda of his own article and accused us of borrowing ideas of that article. Here it is necessary to say the following.

Firstly, the possibility of involving a third astronaut has been proposed long ago (see, for example [15]). For the first time the paradox of coevals (only without such a name) was published in works of one of co-authors – in the article [10] and in the book [12], 11-12 years before the commentator's article.

Secondly, the book [12] was sent to all major libraries of Russia and CIS, to all libraries of physical institutes in Russia, to many famous Russian scientists and academicians (including the now deceased academician E.P. Kruglyakov - the chairman of the "Jesuit" Commission to Combat Pseudoscience). Materials of this book were discussed at the Congress-2004 "Fundamental Problems of Natural Sciences and Engineering", at International Scientific Conference "Space, Time, Gravitation" in 2004 and 2006, at International Conference "The Seventh Okunev's Readings" in 2011. The book is available at well-known Websites: World Science Database, Natural Philosophy Alliance, John Chappell Natural Philosophy Society and Natural Philosophy Database. Since 2004, the book [12] is in the electronic access in 6 languages at www.antidogma.ru. This site is included in the serious study [2, 16]. In 2004 the book was presented to the co-workers of the theoretical department of GPI RAS that oversees the magazine "Engineering Physics" (including to the editor in chief), in which Commentator's article was published. It is hard to believe that the respected commentator "lives in a vacuum".

Thirdly, as a paradox in the book it was proposed the symmetric scheme of a type flower with arbitrary angles of flying. If we take only a part of the scheme with $\alpha = 180^\circ$, it is obvious that we will have the triplet paradox that commentator ascribes to himself as the discoverer.

Despite all the above mentioned, in our article we did not accuse the commentator in borrowing of the ideas. Moreover, in our article we referred to commentator's article, as we believe that the SRT is false theory. And it cannot be priorities in the restoration of the truth - it is the moral duty of every normal scientist (It is necessary to go back to Galileo and Newton - they have priority here!). So let accusations us in borrowing ideas remain on the conscience of the commentator.

Let us now turn to the following sections of commentator's criticism.

II. THE MAIN PART

It's a "surprising" theory - the SRT! Not the theory helps scientists to discover something new and to easily explain phenomena, but scientists should be worried, how would accidentally to not fail this theory and to not reveal its flaws. It is now a "great" goal of scientists: at all costs to save the SRT! Mathematicians help in this disservice. Poorly understanding the physical meaning of values, they are trying to impose the rigor and forever preserve the false theory. Difficulties with physics in education lay in the fact that the teaching of logic and a good philosophy were removed from the universities, but the imbalance was made in favor of formal mathematics. It can be noticeable that relativists often

must perform "four-storey" mathematical calculations to get the result, which is obvious without any calculations in classical physics. All the paradoxes of our article have been constructed according to the well-known principle: "for reasonable - enough" (*Sapienti sat*).

Commentator-mathematician is weakly familiar with the physical literature. It is immediately clear from the first paragraph of the second Section, where he fantasizes some universal unity for the space-time. It follows from the name of the theory itself that there is no unity of all space-times: results will be different for each observer; and SRT announces these results are objective, but not seeming. Commentator can read the point of view of modern books and textbooks in [17-27].

In the paradox of coevals the commentator does not understand that children could further continue their move - to the point B_1 and A_1 respectively. Because of the symmetry, the relation between times (between their ages) would remain the same. Therefore the results of the paradox of coevals and the triplet paradox must be identical from the physical point of view. However, for the commentator not our physical world is real, but game with mathematical letters. If the parallel translation, expressing the homogeneity of space (in classical physics and in SRT), changed the results, they would cease to be objective! Instead of two coevals, two series one after another flying astronauts can be launched towards each other. Then one and the same astronaut can participate in the paradox of coevals when compared with some astronaut, but can also participate in the triplet paradox when compared with other astronaut. And all of this will occur in exactly the same inseparable symmetrical manner. But the commentator does not feel the real physical world. Moreover, the commentator does not familiar with the principles of experimental physics. Unlike mathematician, physicist comes from the values which are measured directly in the experiment. For example, the proper time and length remain the same (that is stated not only in the classical physics, but also in the SRT). So, reasoning of the child A would have to rely on his own time. But he must calculate: 1) the time elapsed at the beacon, while the beacon flies to the child A with the speed v , and 2) the time elapsed since the birth of the child B , while the child B flies to the child A with the speed V_{ab} . Further, from the standpoint of the child B it is necessary again to start with his own time, and to calculate: 1) the time elapsed at the beacon, while the beacon flies to the child B with the speed v , and 2) the time elapsed since the birth of the child A , while the child A flies to the child B with the speed V_{ba} . And for the observer at the beacon it is necessary (from his viewpoint) to calculate the lifetime of children A and B , and compare with his own time. But rather than to look at his own wristwatch, commentator chose to ask what the flying observer at the beacon sees on his watch, i.e. he preferred to "get his left ear with his right hand", that no physicist does.

Let us now turn to manipulation of the commentator with mathematical symbols. Recall that the fixed observers at A_1 , O_1 and B_1 are placed in one and the same frame of reference and their time is synchronized. The commentator writes, if the start event for the child A is: $(-d, t_a)$. But we synchronised the time at the time of birth of the child, i.e. $t' = t = 0$, and from (1) it can be seen that $t' = -\gamma vd/c^2$. But the child did not yet exist in a negative time! Similarly for another child, but he became to be suddenly grown old at the time of his birth: $t = \gamma vd/c^2$. These are ones of those moments that the real physical world can be different from the imaginary mathematical manipulations with letters.

Nevertheless, we try to understand what the commentator wants to impose us. Of course, after mathematical manipulations including the subtraction of such non-existent values, his result in (4) is written the same that we have suggested for the SRT: $d/(\gamma v)$ - in γ times less than that in the classical physics. It could be easier to receive it. From the viewpoint of the child A , the distance to the moving beacon is reduced in γ times, $d_1 = d/\gamma$, hence the time of the beacon movement $t = d_1/v = d/(\gamma v)$ without undue chicanery. But this is the age of the child A from the viewpoint of an observer at the beacon (or an observer at a fixed point A_1)

that in the SRT is called “time dilation in the moving system”. Or this is the time that passed at the beacon (or at a fixed point A_1) from the viewpoint of the child A . This can be read in any textbook on theoretical physics. But this time is not the proper time of any of the observers: neither the age of the child A with his own point of view, nor beacon’s time that passed with its own point of view. Otherwise, the principle of relativity itself would be violated when compared with the data of an observer at the beacon (that the commentator even does not see).

Further, when the commentator obtains the expression (7) in the subsequent calculations, he again wrongly understands the meaning of such manipulations with the Lorentz transformations and the physical meaning of the expression (7). This - not the age of the second child! This is just the time that must elapse between the birth of the second child and the meeting at the beacon according to the SRT **in the opinion of an observer at the beacon**. Naturally, from the viewpoint of an observer at the beacon, both child’s ages are one and the same, since children move symmetrically with respect to this observer: (4) = (7). Nobody disputes with such the banality in classical physics, or in the SRT.

I would not like to accuse the commentator in a scientific fraud, most likely it's just a general lack of understanding of mathematicians that it is necessary to take into account the physical meaning of all quantities in physics, but the commentator again makes mathematical fit after the formula (7), claiming that the second child will have the same age according to the first child's opinion and vice versa. In fact, the commentator makes the calculation again **from the viewpoint of an observer at the beacon**: what the estimated time should every child assume about another child according to the SRT (taking into account the relativistic velocity addition law)? Again, the situation is symmetrical with respect to an observer at the beacon.

But from the standpoint of experimental physics, each of the participants had to compare **the proper time** of each (glancing at own watch and clearly seeing the age of all participants **at the meeting**) and those times that **each participant** calculated **on each other** according to the rules of SRT. And then there arises a contradiction: all own and calculated times are different that contradicts at least someone's experimental observations (for reference: d/v , $d/(\gamma v)$, $d(1+v^2/c^2)^2/(\gamma v)$, etc.).

Unfortunately, some relativists-mathematicians do not understand the physical difference between the direct and inverse Lorentz transformations. They employ them by arbitrary ways, just to fit under the advance requested (for the SRT) result. Some critics of relativism even use the name of "the paradox of stroke" associated with this arbitrariness. Let us recall the well-known story of the marshal of Napoleon: what to choose - Napoleon gets up on tiptoe to take a book, or to shorten the marshal on the whole head? According to the relativists-mathematicians, the result will be the same: both became of equal length. But the result will be different (Marshal is dead) with a real-life perspective.

Let us now turn to the subsequent putative pseudo-explanations. The commentator did not understand many of the standpoints of our article; why to write completely empty phrases on such occasions? In such cases we want to say only one thing: first read the text carefully and catch its meaning! Therefore, we will respond only to those comments, which touch something substantially from the viewpoint of physics, mathematics or philosophy.

Concerning the paradox of pedestrians, length contraction and time dilation are studied in all textbooks on the SRT in the Part "**Kinematics**". These effects are declared as kinematic effects. Pedestrians begin to move at a pre-selected one and the same law. It is clear that the transitive process (far-fetched by the commentator) lasts a few tenths of a second. None of the pedestrians can "fly away" for hundreds of meters during the tenths of a second. So the paradox is maintained (but if someone wants to deceive himself and to ignore the obvious, it is his personal choice).

Then again, the commentator makes scientific fraud with a pseudo-explanation of the motion in two circular orbits: he "finds" the obvious result with the time of both spaceships $t' = t''$ from the viewpoint of **a stationary observer**. But we asked about the time of each of the astronauts from the viewpoint of the other one. Thus, the commentator doesn't even understand the keyword in the title of the theory - "relativity".

Then, again, the commentator did not understand that "the paradox of the sawn ruler" is connected to the problem of the parallel translation of movements in space, which is assumed to be homogeneous and isotropic (both in classical physics and in the SRT). This is the paradox of the kinematics (as it is claimed, kinematic results in the SRT do not depend on the prehistory - on the acceleration process). Obviously, the overclocking acceleration in both cases can be performed according to pre-selected identical laws (for example, by the force acting on each molecule of the ruler, or by two forces acting at points 1/4 and 3/4 of the ruler, etc.). Although the acceleration has no relation to the inertial parts of trajectories, as well as Bell's paradox, which is ambiguously perceived by researchers.

The commentator does not understand, as it is claimed in the SRT, that the space merged into a single entity with the time - "spacetime", but such the object is supposed to be objectively his own for each observer (and, according to the rules of the SRT, it should be calculated in such a manner).

Why commentator condescends to the paradox of the turn of sliding rods, if he himself declares that anyway did not understand it and did not try to grasp? The velocities are set for each of the rods, since we are interested in a turn of each rod and in the turn of rods relative to each other. The relativistic law for velocity addition would be necessary, if we were interested in the final speed relative to ground, but it is not the case.

III. CONCLUSION

In modern physics it is sometimes found the practice of "sweeps of existing problems under the carpet" (remember Feynman's revelations). The purpose of our article [1] was to excite the interest of readers to self-thinking on the existing problems. The purpose of the commentator is not clear for us. The authors hope that conscientious readers can get acquainted with the original sources [1-4, 12, 14] and draw their own founded conclusions.

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