Critics of some aspects of the special relativity theory

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The paper is devoted to the critical analysis of some positions of the special relativity theory (SRT) and to the questions connected with this subject. Significant attention is given to logic contradictions of the SRT.

1. Introduction

As a rule, relativists do not listen critical remarks to the relativity theory and do not read works of the opponents, preferring "to cook in own juice". They have purposefully created a myth that the SRT is confirmed with many experiments, and the relativistic logic is ostensibly consistent. One academician even has compared the relativity theory to the multiplication table. Apparently, if someone has written frank bosh, and between paragraphs has placed the multiplication table, the given academician would call all to check up "calculations" and to support "the theory". Actually, rare examples of their "defense" are constructed by a principle of "the army service regulations from a joke":

Item 1. The relativistic doctrine – is unique true.

Item 2. Do all procedures strictly on the ordered relativistic algorithms and do not put "superfluous" questions. The note. If there arise any complexities with relativistic interpretation, you must urgently fabricate the other, more safe for the SRT, scheme, which remind the former one in something only.

Item 3. Read Item 1 all over again.

It is easy to see the defectiveness of such a "logic". First, being exclusively within the limits of one closed mathematical algorithm, it is not possible to see its contradictoriness to other real physical properties or mathematical algorithms (Remember the Goedel's theorem of incompleteness, or - it is even easier - a known plot from children's "Jumble Stories" when 28 was divided on 7 and it turned out 13, and then this "equality" "was checked" by three more ways). Secondly, necessity for relativists to study the criticism of opponents carefully can be elementary understood on the famous example of the Great Fermat theorem. Thousands of proved cases for different exponents n and millions checked up x, y, z within 350 years did not prove this theorem. But if somebody has casually found out the unique counterexample, the theorem would be denied. That is, infinite (!) number of confirmations cannot outweigh even one refutation. This is the reason why it is necessary for relativists to think above those contradictions which were found out by opponents, instead of to compete in quantity of cases where contradictions are purposely hidden by them (if, certainly, relativists would be interested in the True, but not in own authority). Contradictions are found out in all key moments of the SRT [1].

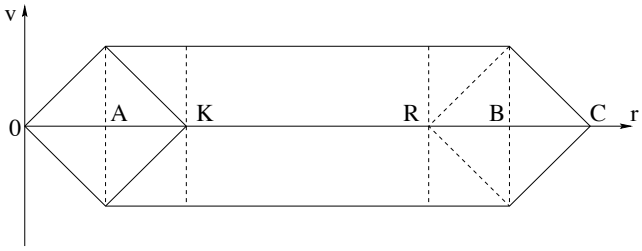

Figure 1: The "role" of accelerations in the paradox of twins.

2. Some paradoxes

We shall begin with the traditional paradox of twins. Many relativists involve acceleration of one of twins for its "explanation". We shall remind according to the SRT, that without acceleration, in opinion of each brother, another one should appear younger. However, we can see from Figure 1 that regions $|OA|$ and $|BC|$ with accelerations can be fixed equal in length. But for different cases i, we can change the distance $|AB|_i$ of flight with a constant (on the module) big speed. For example, we can choose this distance in 3, 5 times more than the initial one, etc.

It is clear that the same acceleration cannot explain a various difference in the age of twins ΔT_i for all these different cases. Moreover, the brother-homebody can be not too lazy and "take part" only in the accelerated movements (see [2]) at sections $|OA|$ and $|AK|$, which are completely identical to the analogous sections for the brother-astronaut (starting at the calculated mo-

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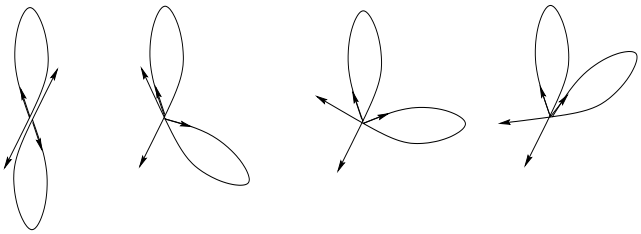

Figure 2: The "influence" of acceleration on time in isotropic space.

ment when the brother-astronaut will fly through the point R). Thus, the initial "explanation" of twins paradox by means of an acceleration, to which adhered Einstein, Pauli, Born and others, can be handed over in a "dusty archive" as not having any scientific value.

It is easy to prove that the presence of mutual accelerations of astronauts cannot lead to a difference in the time course. Most easier, it can be made by means of two identical loops represented in Figure 2. Astronauts start from one point, and, being accelerated by identical means on the given loops up to identical large speeds, again fly through the initial point simultaneously. Naturally, owing to symmetry of a problem, changes in their ages during the acceleration will be identical, that the observer at the start point can confirm.

We shall remind, that acceleration is a vector value. We can turn one of the loops without change of its form at any angle around the start point. Though, in each such a case relative accelerations of astronauts will different, their ages in any of cases will be changed at the same value. This is a manifestation of the space isotropy.

Further, to these two loops we can attach identical rectilinear sections for movement with an identical constant large speed. The identical U-turned loops can be attached to the ends of these sections. Thus, the equally accelerated astronauts fly through one point after the termination of acceleration. After this, they fly with the same constant speeds. After the following turn, they fly back with equal constant speeds and are slowed down by identical manner at the former loops. Owing to symmetry of the problem, the age of astronauts-twins will be obviously identical.

Again the trajectory of the twin-II can be turned at any angle relative to the twin-I around the start point O (see Fig. 3). And, due to the vector character of speed, their relative speed will be changed. Therefore, according to the SRT, the age must be changed, that is obviously absurd (contradicts to the space isotropy).

Now we shall consider the spatial paradox connected with ostensibly existing relativistic turn of a rod. Let's remind the following problem. A thin rod of some length L flies along the axis X with a speed $\mathbf{v}$, and the plate with a niche of the same size L runs with a speed

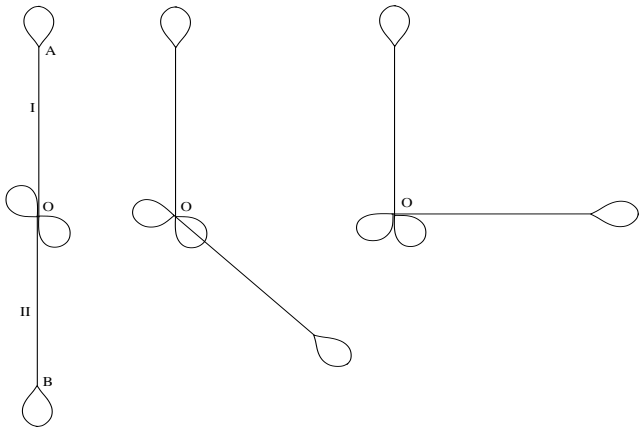

Figure 3: Independence of twin's age on the flight direction.

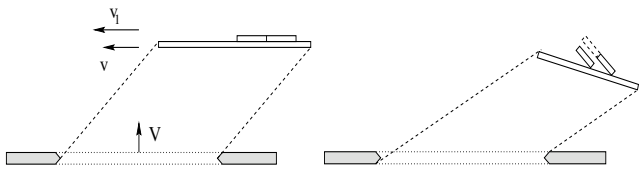

Figure 4: The "turn" of a rod and space homogeneity.

$\mathbf{V}$ in a direction of the axis Z, so that in the classical case the rod will precisely pass through the niche. Relativists "eliminate" contradictions in indications of different observers by introduction of relativistic turn of the rod [3]. However, the situation with the relativistic angle of rod turning can elementarily be made dramatic one, since it uniquely depends on the ratio of speeds. Let the other smaller rod l slides with some speed ($\mathbf{v}_1$ on our rod. Observers on both rods will claim that the clearance between the rods is absent. However, according to the SRT and due to different speed of rods ($\mathbf{v}$ and $\mathbf{v}_1$), the big rod L and the small rod l should be turned at different angles relative to the plate for the observer on the plate. That is in the SRT the small rod will be turned upwards relatively the big rod, and there appears a clearance between the rods. We have the obvious contradiction.

This contradiction can be made even more vivid, if we will use the principle of division of a whole to pieces (firstly applied by Galileo to prove independence of acceleration due to gravity from weight of a falling body; brilliant application to the SRT see, for example, in [2]). Then if we will consider the rod l as a single whole, one situation (see Fig. 4) turns out, as if the second half of the rod l is raised at some height above the rod L, on which there is a sliding. But if we will consider the small rod consisting of real two halves, then the given situation for the second half-rod is simply similar to the case of translation of origin and these halves appear with the forward ends on the big rod, but spatially divided (see Fig. 4). Last situation is especially strange, since the

cut of the zero size should remain zero at any turns or multiplications on the relativistic factor. Let's notice, that we have a little more "accompanied" to the SRT, having turned the small half-rods ABOVE the greater one. Actually, in the SRT there are no real firm bodies at all, impenetrable one for the other. All SRT formulas are derived for light flashes (model), but the latters are capable to pass through each other. As a result, to coordinate with indications of the observer at the rod center, it is necessary to assume, as if one rod passes through another one (absurd discrepancy of the model to reality).

Thus, representations of the SRT come to the contradiction with such an important and checked up element of relativity concept as the uniformity of space also (an opportunity of parallel translation of the coordinate origin).

3. The Lorentz transformations

The distributed by some relativists a stamp, as if the SRT is simply new geometry and already therefore it is ostensibly consistent, looks absolutely strange. It is necessary to remind them, that the physics studies reasons of phenomena and the concrete mechanisms directly influencing on the phenomenon under investigation. Certainly, for obtaining the mathematical solution in the physics, transformations of coordinates (for example, conformal) are often used. As a matter of fact, they are elementary substitutions only (existing in school and student's problems as a "whole sea"). However, if somebody will claim that, "since solutions are deduced true, then the Universe was transformed from external area in internal area of a circle", all physicists will understand "the appropriate place" for similar statements. But if another "Very Big relativistic scientist" tell that he compressed all Universe when he went to the nearest bakery, a "heap of echoed" confirms this bosh (possibly, these poor devils did not read a fairy tale "Naked king" in the childhood). And the existence of the Lorentz transformations has no matter at all in this case.

First, the Lorentz transformations are not the only invariant, but only ONE OF mathematical invariants of the wave equation. For example, the Fought transformations, which are also being an invariant of the wave equation, have been discovered formerly.

Secondly, from the mathematics itself no physical principles follow: the invariance property is completely defined by a combination of operations and "letters" in the equation. In particular, the Lorentz transformations with the speed of sound instead of the speed of light c can be used for some acoustic problems just because they are invariant.

Thirdly, the Lorentz transformations are obtained for the process of light propagation in emptiness. But this is an absolutely particular physical phenomenon, and it is not necessary to exaggerate its generality. Let's notice, that if some mathematical equation appears to be invariant as relative to the Lorentz-type transformations with some constant c, it means only that among particular solutions of the given equation there are "surfaces" of the wave type, capable to extend with the speed c. Thus other particular solutions with the own invariant transformations can present even at the chosen equation, not speaking already about other mathematical equations, that is for mathematics no all-mathematical conclusions follow from the fact of invariance. Only relativists try "to inflate a soap bubble from the particular phenomenon". Anybody does not make all-Universal conclusions from the invariants of the heat conductivity equation for hydrogen or from properties of hydrogen plasma on the ground only that all atoms consist of electrons, and kernels have protons. For light also, it is impossible to define the speed of light in real substances using one scalar constant c.

We remind that, despite of a huge role of the electromagnetic phenomena in our world, perturbations extend with the speed of sound in media. And this speed is not determined by one constant c too, but depends on concrete substance (for example, in crystals it is anisotropic).

4. On invariance of the Maxwell equations

We consider in detail a "basic" question on invariance of the Maxwell equations, widely boosted in the SRT. In the textbook [4] the following four equations (in the differential form) are ascribed to the system of fundamental equations of electrodynamics:

$$\text{rot } \mathbf{H} = \frac{4\pi}{c}\mathbf{j} + \frac{1}{c}\frac{\partial \mathbf{D}}{\partial t},$$

$$\text{rot } \mathbf{E} = -\frac{1}{c}\frac{\partial \mathbf{B}}{\partial t},$$

$$\text{div } \mathbf{D} = 4\pi\rho,$$

$$\text{div } \mathbf{B} = 0.$$

However this system of eight equations (in the coordinate form) is obviously insufficient to determine 16 values (taking into account all components) $\mathbf{E}, \mathbf{D}, \mathbf{B}, \mathbf{H}, \mathbf{j}$ and ρ. It is necessary also to introduce the medium characteristics into the equations. In view of existence of nonlinear, non-uniform, non-isotropic media, it cannot be made in the general case. It is possible to introduce some particular model representations about linear dependences in certain limits only:

$$\mathbf{D} = \varepsilon\mathbf{E}, \mathbf{B} = \mu\mathbf{H}, \mathbf{j} = \lambda\mathbf{E}$$

and to add 9 more equations with three new unknown functions $\varepsilon, \mu, \lambda$ (or constants - for model problems),

describing the medium. There not exists uniform invariance of the last three equations in the general case. We shall remind, for example, about the existence of ferromagnets and ferroelectrics, for which the phenomena of a hysteresis are observed, that is the course of process depends on its pre-history. In such a case the behavior cannot be described by the differential equations at all. Whether it is possible "to inflate a soap bubble of the SRT" on invariance of a part from the full system of equations only? Obviously, no! So, it would be possible to extract any parts from any equation and to speculate on invariance of these items. Besides, the Lorentz transformations (a hyperbolic turn) change relations between angles. Hence, change of the form of complex borders should be taken into consideration at transition between moving systems. Thus, the system of Maxwell equations in arbitrary media cannot be invariant under some unique physical transformation.

First four equations can represent an independent interest in consideration of fields in emptiness only. However invariance of the Maxwell equations in emptiness under the Lorentz transformations means absolutely nothing for other phenomena. First, in empty space we can cut off half of piece and increase it twice – we shall obtain the same piece. Therefore, in empty mathematical space it is possible to use any systems of reference, consistent geometries and translating factors. It can be defined by convenience of the mathematical description only. However, the presence of real physical bodies and fields in space determines natural registration points, characteristic scales and interrelations between objects. All this defines differences of the real physical space from the empty mathematical space. Secondly, the property of some interactions to propagate in vacuum with the speed of light does not determine speed of propagation of these interactions in a medium. Despite of a huge role of electromagnetic interactions, disturbances in media propagate with the speed of sound. Knowing one constant c for vacuum, it is impossible to determine (for our "electromagnetic" world) speeds of sound and light in gases, liquids and rigid bodies. For example, light of not any frequency can propagate in substance (we shall remind about dispersion, absorption, attenuation, reflection). It is not clear, how in isotropic space there could be arisen an anisotropy of real rigid bodies. All these and many other properties fall outside the limits of applicability of the Maxwell equations in emptiness (but the SRT offers the cloning spherically symmetric properties of dot light flashes in emptiness to all properties of material bodies and media). Hence, to adjust all properties of the world under invariance of the Maxwell equations in emptiness is too overestimated claim of the SRT. Thirdly, the separation of the unique (in its action) field on electric and magnetic parts is conditional enough. Therefore, an invariance of these artificial items cannot have crucial importance.

The important remark. The Maxwell equations itself can gain some physical sense only, if the physical way of measurement of introduced field characteristics will be specified. At present, the equation of charged particle movement under action of the Lorentz force is reputed as such "a closing equation".

5. Remarks on forces and the modern form of electrodynamics

We shall make small lyrical digression. On what values can forces be dependent (and in what a matter contains, from the general viewpoint, the difference of Newton's and Aristotle's approaches)? Interaction of bodies leads to changes in their states. It is necessary to choose an indicator of this change. Aristotle considered the rest as the basic state and has chosen as an indicator to observe the speed of body movement (its value has been connected by Aristotle with the force causing movement). If one will be content with contemplation, then such choice $\mathbf{v} = f(t, \mathbf{r})$ will be quite enough. However, if to try to create the dynamics of movement, then it became clear after the Galileo mental experiments, that the Aristotle concept of force does not promote to cognize the reality. Though, if to be absolutely exact, this conclusion is adhered to the belief of "relativists of the first wave" - Galileo followers - in the presence of empty space (we notice, that Galileo considered only the isolated identical systems and did not distribute his principle, unlike his pseudo-followers, on interpenetrating reference systems). At presence of ether, the Aristotle rest is locally adhered to an ether which as a whole is not obliged to be "uniformly motionless", but can participate in complex vortical movements, and force is required only for maintenance of a movement which is distinct from the equilibrium one.

The Newtonian choice of the description of bodies' interaction is another. As the indicator of change of a body state, it is considered its acceleration. As a matter of fact, the second Newton law represents definition of concept "force", and, from the viewpoint of functional dependence, force and acceleration coincide to within dimensional factor (mass). As an ideal, this way of description of movements can be presented in the following form: $m\mathbf{a} = \mathbf{F}(t, \mathbf{r}, \mathbf{v})$. However, the Nature not always opens to us its secrets easily: instead of the ideal expression for force we may mathematically use that expression which was found from experiments. It is not yet solved the problem of finding explicit expression for such "ideal" forces in the case of arbitrary configuration and movement of a force source and medium, for example, proceeding from the results for the static expression of forces.

It is visible from the generalized representation $\mathbf{F} = \mathbf{F}(t, \mathbf{r}, \dot{\mathbf{r}}, \ldots, d^3\mathbf{r}/dt^3, \ldots)$ that any derivative is preferred by nothing and only experiment can define

forms of forces realized in the nature. Here we, however, are interested in the fact that the relativistic equation of movement with the Lorentz force $\mathbf{F}$ can be elementarily written down as the classical second law of Newton with some other force $\mathbf{F}'$. For this purpose it is necessary to find a derivative explicitly in the left-hand side of the relativistic equation $\frac{d\mathbf{p}}{dt} = \mathbf{F}$ and to multiply scalarly the left and right parts of the equation on $\mathbf{v}$. Then, the expression follows

$$\frac{m(\dot{\mathbf{v}}\mathbf{v})}{(1 - v^2/c^2)^{3/2}} = (\mathbf{F}\mathbf{v}).$$

Substituting it in the initial relativistic equation, it turns out the second law of Newton with the force

$$m\dot{\mathbf{v}} = \sqrt{1 - \frac{v^2}{c^2}}\left(\mathbf{F} - \frac{\mathbf{v}(\mathbf{F}\mathbf{v})}{c^2}\right).$$

Formally, in the given expression as a letter $\mathbf{F}$ there can be any force. However, there are no proofs that the relativistic equation of movement can be applied to something, except to the charged particles being under an action of the Lorentz force. Thus, it is supposed that forces will be transformed at transition from one system to another one.

Generally speaking, the idea of transformation of forces at the transition from one system of observation to the other one represents the nonsense for all experimental physics. Really, the writing the Arabian ciphers on a dynamometer does not depend on movement of an observer, that is the indication of the dynamometer fixing force will not change from movement of the observer. Force operates between "a source" of this force and a concrete "object" of its application, but movement of any extraneous observer's eyes is no relation to the problem at all (that is force can be defined only by properties of a source, object and their mutual movement).

Let's remind that during the different time periods the Lorentz force was not the unique form for an electromagnetic force. Among the well-known expressions there were: Ampere's force, Veber's force and other ones. If the modern electrodynamics had the self-consistent character (since fields are manifested on their power influence), then the expression for electromagnetic force should be deduced from the Maxwell equations, instead of to be artificially entered. Such an expression has been received by J.J.Smulsky [5], and it differs from the expression of the Lorentz force.

Whether it is possible to consider the Lorentz force expression as the strict and consistent electromagnetic force on principle? Apparently, no! Though achievements of the modern electrodynamics are well-known, it is necessary to note some critical moments too. First, even in the modern electrodynamics a braking by radiation is additionally introduced, but, however, it leads to senseless self-acceleration of charges (limited only postulatively by imposing conditions on values of fields). Secondly, the "origin" of quantum mechanics itself demonstrates that the Lorentz force does not describe adequately behavior of charges on scales of an atom. Thirdly, for the known phenomenon of the particle drift it is strange, that its speed $\mathbf{v} = c[\mathbf{E} \times \mathbf{H}]/H^2$ appears independent on a charge, mass, and values of fields, but depending only on the ratio of fields E/H.

Thus, the system of differential equations of the modern electrodynamics and its representations cannot be considered as strict and completely self-consistent on principle, capable to impose restrictions on other sections of physics.

Final conclusion: the return to classical concepts of space, time and all derivative values is needed. They are based on all set of experimental data and have a much greater degree of generality, than any particular theory or system of equations.

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