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Stop Teaching Einstein's Special Relativity

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Originally, I found mistakes in Einstein's Special Relativity regarding the velocity of light in "appedix, A: 4, ***The meaning of time***" in the textbook: " **Physics Principles & Problems**", published by ***Merill publishing company- Columbus, Ohio 43216***. (Please read my paper: "Light velocity is not the limit of all velocities" in the GSJ).

I assumed the mistakes only existed in this textbook since it was not Einstein's original paper on Special Relativity and it was arranged for easy reading in order to teach university students, so the mistakes in that textbook can be disregarded.

But, now reading Einstein's original paper on Special Relativity, which is "**On the Electrodynamics of Moving Bodies**", (please read it at website: http://www.fourmilab.ch/etexts/einstein/specrel/www/) , I also find the same mistakes. So, one more time, I confirm that Einstein's second principle regarding the velocity of light as a universal constant is wrong.

The evidence of Einstein's mistakes in the original paper are shown as follows:

Firstly, in §1, ***Definition of Simultaneity***, Einstein wrote:

"In agreement with experience we further assume the quantity

$$\frac{2\mathrm{AB}}{t'_A - t_A} = c,$$

to be a universal constant--the velocity of light in empty space."

And in §2 , ***On the relativity of lengths and times***, he wrote:

We imagine further that with each clock there is a moving observer, and that these observers apply to both clocks the criterion established in § 1 for the synchronization of two clocks. Let a ray of light depart from A at the time[4] 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

$$t_{\mathrm{B}} - t_{\mathrm{A}} = \frac{r_{\mathrm{AB}}}{c - v} \text{ and } t'_{\mathrm{A}} - t_{\mathrm{B}} = \frac{r_{\mathrm{AB}}}{c + v}$$

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.

We find that in the basic equations: $\frac{2AB}{t'_A - t_A} = c$ in §1, and $t_B - t_A = \frac{rAB}{c - v}$ and $t'_A - t_B = \frac{rAB}{c + v}$ in §2, Einstein used these basic equations to create the equations in §3, §4… §10. This means that the basic equations in §1 and §2 are the foundation, and if they are not certain, then the equations in §3, §4…§10 are wrong.

Regrettable. Indeed, if Einstein has to give the supposition of the condition "when v=c …" for equations in §2 : $t_B - t_A = \frac{rAB}{c - v}$ and $t'_A - t_B = \frac{rAB}{c + v}$, which are basic equations to create the equations in §10, but he doesn't do that. He has given the supposition of condition of "when v=c…" for equations in §10 in ***Dynamics of the slowly Accelerated Electron*** :

$$\begin{aligned} W &= \int \epsilon X\, dx = m \int_0^v \beta^3 v\, dv \\ &= mc^2 \left\{ \frac{1}{\sqrt{1 - v^2/c^2}} - 1 \right\}. \end{aligned}$$

Thus, when $v=c$, W becomes infinite. Velocities greater than that of light -- as in our previous results -- have no possibility of existence."

We can't allow this. If we are the teachers, we would not accept such work from our students.

Now, we assume that Einstein has given the supposition of the condition of "when v=c…" for the equation in §2 : $t_B - t_A = \frac{rAB}{c - v}$ and $t'_A - t_A = \frac{rAB}{c + v}$. We find that Einstein can't say: "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.

So we see that we cannot attach any *absolute* signification to the concept of simultaneity, but that two events which, viewed from a system of co-ordinates, are simultaneous, can no longer be looked upon as simultaneous events when envisaged from a system which is in motion relatively to that system ."

We can say that since the condition "when v=c…", then $t_B - t_A = \frac{rAB}{c - v} = \frac{rAB}{c - c} = \frac{rAB}{0} = \infty$. From this, observers moving with the moving rod would thus find that a ray of light departs from A, which has never reached B, so, the synchronization of two clocks is not significant for them, and thus, Einstein says that "the taking into consideration the principle of constancy of velocity of light" is absurd.

We are right when we say this, because in§1 and §2, the velocity v of the moving rod at v=c or v > c is not forbidden.

With the condition, "when v=c…" in §2, we see that we can not attach any absolute signification to concept of the constancy of velocity of light. We can only say that in the same event of the velocity of light, observers moving with the moving rod see that velocity of light is constant in their position and conception. And observers in the stationary system also see that velocity of that light is also constant in their position and conception. But the constancy of the velocity of light where it is measured by the observers moving with the moving rod can be different from the constancy of the velocity of light where it is measured by the obsevers in the stationary system.

So, In §1, Einstein's opinion as: 'In agreement with experience we further assume the quantity

$$\frac{2\mathrm{AB}}{t'_A - t_A} = c,$$

to be a universal constant--the velocity of light in empty space."
Is not certain.

Secondly, in §3, ***Theory of the transformation of Co-ordinates and Times from a stationary System to another System in Uniform Motion of Translation Relativetly to Former.***

Einstein wrote: "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

$$\frac{\partial \tau}{\partial y} = 0, \frac{\partial \tau}{\partial z} = 0.$$

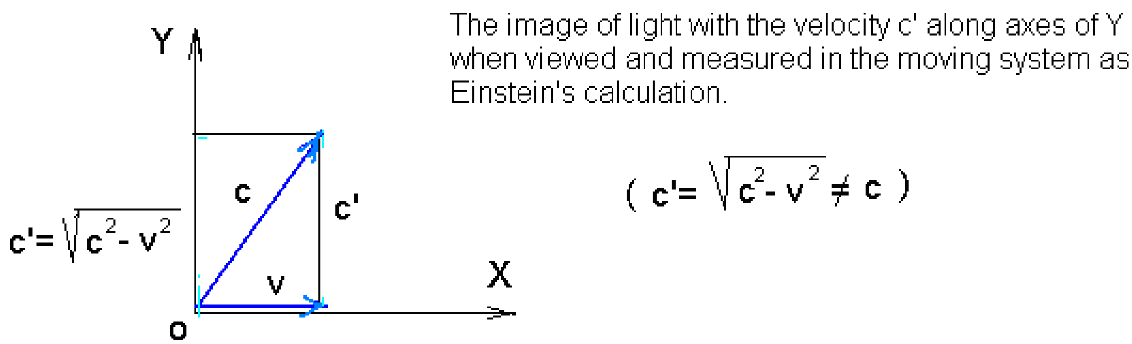
Since τ is a *linear* function, it follows from these equations that

$$\tau = a\left(t - \frac{v}{c^2 - v^2}x'\right)$$

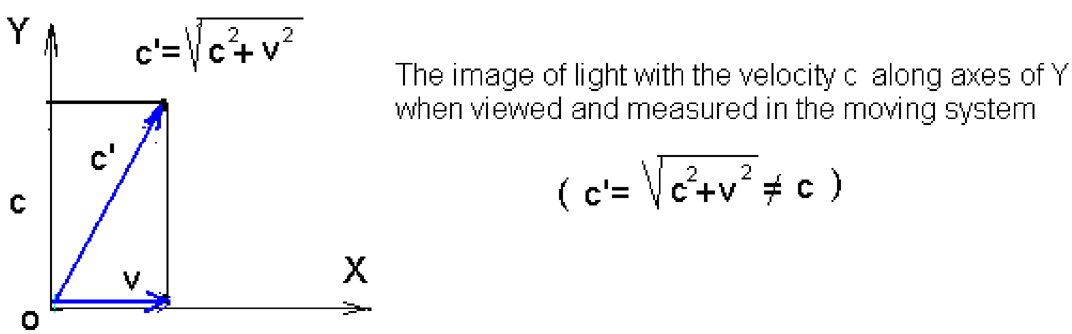
where *a* is a function $\phi(v)$ at present unknown, and where for brevity it is assumed that at the origin of *k*, $\tau = 0$, when *t*=0.

With the help of this result we easily determine the quantities ξ, η, ζ by expressing in equations that light (as required by the principle of the constancy of the velocity of light, in combination with the principle of relativity) is also propagated with velocity *c* when measured in the moving system. "

Einstein's calculation of the image of light which is always propagated along these axes of Y and Z, when viewed from the stationary system, with the velocity $\sqrt{c^2 - v^2}$ … is wrong. If the image of light is always propagated along the axes of Y and Z, when viewed from the stationary system, with the velocity $\sqrt{c^2 - v^2}$ or c' with certain value, then the image of that light has to be also propagated along axes of Y and Z , with the velocity c when measured in the moving system. As Einstein's calculation, we find that the image of light is propagated along axes of Y, with the velocity $\sqrt{c^2 - v^2}$, when viewed from the stationary system, but the image of that light is propagated along axes of Y, with the velocity $\sqrt{c^2 - v^2} \neq$ c when measured in the moving system. Einstein is confused by this. Please see the following illustration:



It is only correct when Einstein calculates the image of light with velocity $\sqrt{c^2 + v^2}$ along the Y axis, when viewed from the stationary system. This is because the image of light is always propagated along the Y axis with the velocity c, when viewed and measured in the moving system. Please see illustration as follows:



Further, when applying the supposition of the condition of "when v=c…", (in §3 it is not forbidden for the velocity of the moving rod, which is v=c or v>c), for equation: $\sqrt{c^2 - v^2}$, we find that $\sqrt{c^2 - c^2} = 0$ is not significant. When the velocity of the moving system is equal to c, does it mean that it is the light propagated along Y, Z axes with velocity zero (0) when viewed from the stationary system? Is there not any light which departs from A in the moving rod as in example §2? This is absurd and nobody realized it.

But if applying the supposition of the condition of “when v=c…” for equation: $\sqrt{c^2+v^2}$, we find that $\sqrt{c^2+c^2}=\sqrt{2,c^2}=c.\sqrt{2}$ is logical and absolutely everybody can realize it.

Returning with the agreement in §3 is that the image of light is always propagated along Y and Z axes when viewed from the stationary system with the velocity $\sqrt{c^2-v^2}$ or c’ with a certain value. But the image of that light is also propagated along the Y and Z axes with the velocity c when measured in the moving system. This means that observers in the stationary system can only view, but can’t measure the velocity of light in the moving system. But observers in the moving system can view and measure the velocity of light in their moving system. So, regarding the velocity of light in the moving system, the view of observers from the stationary system is an illusion and the view or measurement of observers in the moving system is real.

Thirdly, Reading Einstein’s two principles: “The following reflexions are based on the principle of relativity and on the principle of the constancy of the velocity of light. These two principles we define as follows:--

1. The laws by which the states of physical systems undergo change are not affected, whether these changes of state be referred to the one or the other of two systems of co-ordinates in uniform translatory motion.
2. Any ray of light moves in the ``stationary'' system of co-ordinates with the determined velocity *c*, whether the ray be emitted by a stationary or by a moving body. Hence

$$\text{velocity} = \frac{\text{light path}}{\text{time interval}}$$

where time interval is to be taken in the sense of the definition in § 1.

We find that there is a contradictionin the changes of time and length in the moving system and the constancy of the velocity of light.

As for Einstein’s two principles, the velocity of light in the stationary system as well as in the moving system is calculated by the dividing the length (in kilometers) and time when light has moved over that length (in seconds). It means that a light is always propagated with the velocity c=300,000 km/s in the empty space of the stationary system as well as in the moving system. In other words, the velocity of light in the moving system is c=300,000 km/s and the velocity of light in the stationary is also c=300,000 km/s. Since the velocity of light c=300,000 km/s = a universal constant, we find that the measurement which is denoted by a length (km) and a time (s) of the moving system is equal to the measurement which is denoted by a length and a time in the stationary system.

It means that in any case, there will be no changes in length and time in the moving system if Einstein's second principle on the velocity of light is correct. On the contrary, If there is a changes of length and time in the moving system as per Einstein's demonstration, then the constancy of the velocity of light will be incorrect.

But, after calculating, Einstein has given his result of the changes of length and time in the moving system: "It follows from this relation and the one previously found that $\phi(v) = 1$, so that the transformation equations which have been found become

$$\begin{aligned}\tau &= \beta(t - vx/c^2),\\ \xi &= \beta(x - vt),\\ \eta &= y,\\ \zeta &= z,\end{aligned}$$

where

$$\beta = 1/\sqrt{1 - v^2/c^2}.$$

Einstein makes an effort to demonstrate the changes of length and time in the moving system in this his original paper on relativity. But he didn't understand that the changes of length and a time in the moving system contradict his second principle of the velocity of light.

From this contradiction, we find that if we accept the changes of time and length in the moving system as per Einstein's demonstration, then we will have to deny his second principle on the velocity of light which is to be a universal constant. On the contrary, if we accept the velocity of light as a universal constant, then we will have to reject Einstein's relativity theory.

Conclusion:

Einstein's mistakes in the original paper are shown above.

Obviously, Einstein's concept of the velocity of light as a universal constant is wrong. But this incorrect concept of the velocity of light is connected with the development of human knowledge. If we continue to study and to teach Einstein's special relativity, then everyone, especially millions of students in the universities in the world will continue to be confused by this incorrect concept.

That is the why we propose to stop the teaching Einstein's special relativity in universities in the world until it is re-written.

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