ISSN: 2754-4753

Journal of Physics & Optics Sciences

SCIENTIFIC Research and Community

Review Article

Open Access

Criticisms of Einstein's Theory about the Special Theory of Relativity Published in the Annalen Der Physik in 1905

Franco Crivelli

Independent Researcher, Electrical Engineering, Coldrerio Switzerland

*Corresponding author
Crivelli Franco, Independent Researcher, Electrical Engineering, Coldrerio Switzerland.

Received: March 20, 2024; **Accepted:** March 25, 2024; **Published:** April 03, 2024

Preamble
Since I have been trying to understand Einstein's work for more than 10 years, without success, I have chosen the two points below where in my opinion there are some inconsistencies, and I ask if any person with great skills in mathematics and/or or physics, can point out to me where I make mistakes in the interpretation of Einstein's text. I am offering a small prize of 2,000 swiss francs (1,000 for each of the two questions) for anyone who is able to explain in an understandable way even to me, which mistakes I have made. I'm only interested in knowing where I went wrong.

Conditions: the prize is unique and goes to whoever is the first to report my mistakes to me (date with time on the email or date of receipt of the item by post), with correct and convincing explanations. In the case of correct explanations, received by me with the same dates and times, I will draw lots to whom the prize will be awarded. The prize offer is valid until 31.12.2030.

Here the two criticisms (reference pages of Annalen der Physik):
1) Mistake in the simplification of the formulas from page 899 to page 904
2) Mistake in the equation of the formulas on page 901

1) Mistake in the Simplification of the formulas from page 899 to page 904

Einstein says:
Setzen wir für x' seinen Wert ein, so erhalten wir:
and he does not say it clearly, but it implies the substitution of x' with x-$v.t$ in the formulas:

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

$$\xi = a\frac{V^2}{V^2-v^2}x'$$

$$\eta = a\frac{V}{\sqrt{V^2-v^2}}y$$

$$\zeta = a\frac{V}{\sqrt{V^2-v^2}}z$$

and he got the following formulas:

$$\tau = \varphi(v)\beta\left(t - \frac{v}{V^2}\,x\right)$$

$$\xi = \varphi(v)\beta\,(x - vt)$$

$$\eta = \varphi(v)y \qquad \zeta = \varphi(v)z$$

wobei $\beta = \frac{1}{\sqrt{1-\left(\frac{v}{V}\right)^2}}$

In the steps to lead to the formulas above, there is a mistake, and I put it in evidence for τ:
first considering that, at page 899 Einstein says: wobei a eine vorläufig unbekannte Funktion φ(v) ist it achieves that I can substitute a with φ(v) without problems, as I will do here:

$$\tau = a.\left(t - \frac{v}{V^2-v^2}.x'\right) = a.\left(t - \frac{v.x}{V^2-v^2} + \frac{v^2.t}{V^2-v^2}\right)$$
$$= a.\left(\frac{V^2.t - v^2.t - v.x + v^2.t}{V^2-v^2}\right) = a.\left(\frac{V^2.t - v.x}{V^2-v^2}\right)$$
$$= a.\frac{1}{1-v^2/V^2}.\left(t - \frac{v.x}{V^2}\right) = a.\beta^2.\left(t - \frac{v.x}{V^2}\right) = \varphi(v).\beta^2.\left(t - \frac{v}{V^2}.x\right)$$

Here we can see that the factor β is squared, and not in linear form as indicated by Einstein.
I do the same procedure also for ξ :

$$\xi = a.\frac{V^2}{V^2-v^2}.x' = a.\frac{1}{1-v^2/V^2}.(x - v.t) = a.\beta^2.(x - v.t)$$
$$= \varphi(v).\beta^2.(x - v.t)$$

Here also the factor β is squared as before and not in linear form as indicated by Einstein. And, I don't prove it, but

$$\eta = \varphi(v).\beta.y \text{ and } \zeta = \varphi(v).\beta.z$$

To explain the time dilation Einstein introduces at page 904 the following:

$$\tau = \frac{1}{\sqrt{1-\left(\frac{v}{V}\right)^2}}\left(t - \frac{v}{V^2}x\right) \quad \text{und} \quad x = vt$$

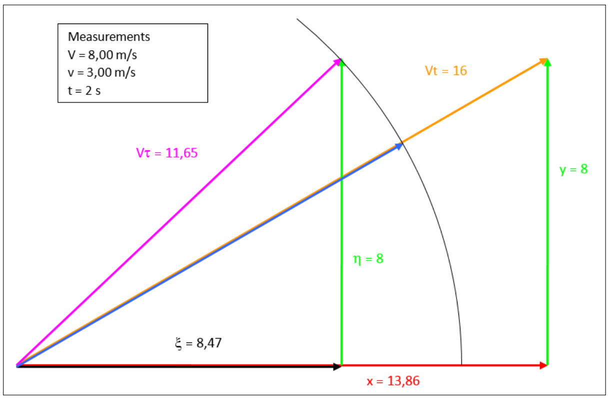
substituting $x = vt$ we get $\tau = \frac{1}{\sqrt{1-\left(\frac{v}{V}\right)^2}} t.\left(1-\left(\frac{v}{V}\right)^2\right)$

as seen above, we need to use β^2 instead of β, therefore

$\tau = \frac{1}{1-\left(\frac{v}{V}\right)^2}\, t\left(1-\left(\frac{v}{V}\right)^2\right)$ and at the end we obtain $\underline{\underline{\tau = t}}$

2) Mistake in the Equation of the formulas on page 901

For the following simplified representations, I set z = 0 and I use <u>very simple values which are obviously not real</u>. Nonetheless, the formulas must give correct results.



I point out that to switch between (I used the vector shape),

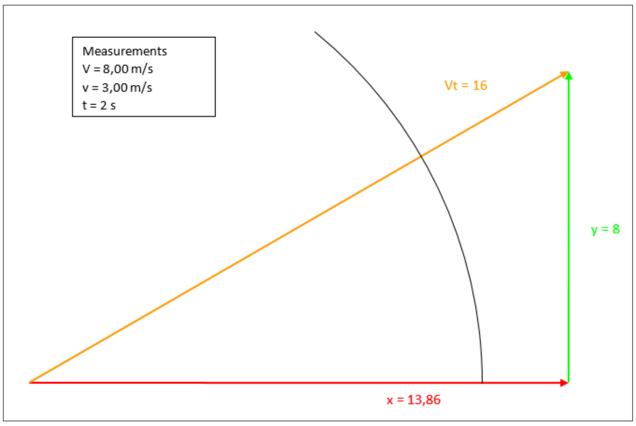
$$\vec{\imath}.x + \vec{\jmath}.y + \vec{k}.z = \vec{V}.t \qquad \text{a)}$$

to

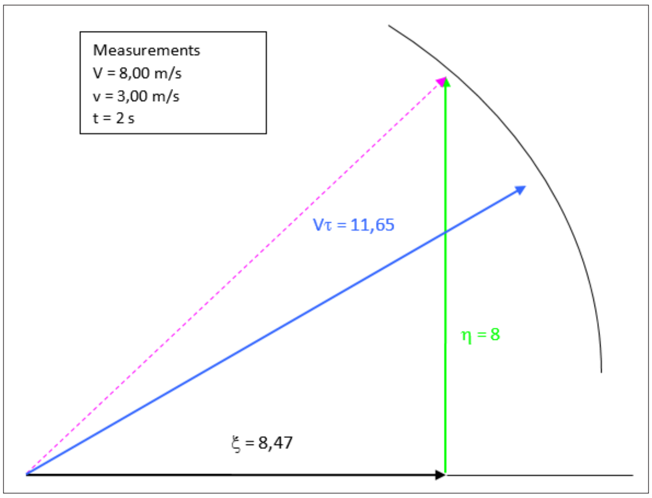
$$\vec{\imath}.\beta.(x - v.t) + \vec{\jmath}.y + \vec{k}.z = \vec{v}.\beta.\left(t - \frac{v}{V^2}.x\right) \qquad \text{b)}$$

in the left side, only the vector along the x axis has been modified, while in the right one by multiplying a scalar by the vector $\vec{V}$ the components of all directions of the vector have changed, therefore it is impossible to have an equality !!!

$$\vec{\imath}.\beta.(x - v.t) + \vec{\jmath}.y + \vec{k}.z \neq \vec{V}.\beta.\left(t - \frac{v}{V^2}.x\right)$$



The sum of the two starting vectors, red plus green, correctly gives the yellow vector.



However, as we can see, by applying Einstein's transformation equations (Transformationsgleichungen) to the first formula, we DO NOT obtain equality: the sum of the two black and green vectors DOES NOT give the blue vector. The magnitude of the blue and dashed purple vectors are equal, but the two vectors are NOT equal.

Again, to highlight this unacceptable mathematical inconsistency, I proceed as follows:
I take for granted what has been demonstrated in point 1) and that, $\varphi(v)$=1 (page 902), that is,

$$\tau = \beta^2\left(t - \frac{v}{V^2}x\right); \qquad \xi = \beta^2(x - vt);$$

$$\eta = \beta\, y \quad \text{and} \quad \zeta = \beta\, z$$

Einstein says that by applying the transformation formulas, he developed, to the formula, $x^2+y^2+z^2=V^2.t^2$ after a simple calculation he obtains $\xi^2+\eta^2+\zeta^2=V^2.\tau^2$ In the right side of the two equations [a) and b) page 2-3] the vector $\vec{V}$, which is always the same vector (same symbol), is multiplied by a scalar, t and respectively τ which cannot introduce either a change in direction. Therefore, the two vectors $\vec{V}t$ and $\vec{V}\tau$ must be parallel.

$$\vec{\imath}.x + \vec{\jmath}.y + \vec{k}.z\,(with\ component) = (with\ magnitude)\,\vec{V}.t$$

↓ checking the parallelism of the two vectors using the cross product **the two vectors are not parallel** ↓

↓ checking the parallelism of the two vectors $\vec{v}$ parallel to $\vec{u}$, or $\vec{v} = \lambda.\vec{u}$ **the two vectors are parallel** ↓

$$\vec{\imath}.\beta.(x - v.t) + \vec{\jmath}.y + \vec{k}.z\,(with\ component) = (with\ magnitude)\,\vec{V}.\beta.\left(t - \frac{v}{V^2}.x\right)$$

The cross product $\vec{a}\, X\, \vec{b}$ of two parallel vectors is equal to 0 (zero).

$$\vec{V}t \ X \ \vec{V}\tau = \begin{vmatrix} \vec{\imath} & \vec{\jmath} & \vec{k} \\ x & y & z \\ \beta^2 (x - vt) & \beta y & \beta z \end{vmatrix} \neq 0$$

$$= (y * \beta z - z * \beta y)\vec{\imath} - \big(x * \beta z - z * \beta^2 (x - vt)\big)\vec{\jmath} + \big(x * \beta y - y * \beta^2 (x - vt)\big)\vec{k}$$

$$= (\beta yz - \beta yz)\vec{\imath} - \big(\beta x z - \beta^2 z (x - vt)\big)\vec{\jmath} + \big(\beta x y - \beta^2 y (x - vt)\big)\vec{k}$$

$$= 0 * \vec{\imath} - [\beta z(x - \beta x + \beta vt)]\vec{\jmath} + [\beta y(x - \beta x + \beta vt)]\vec{k} \neq 0$$

So, the cross product of these two vectors is different from 0 (zero).
It is also necessary to take into account, as seen before, that equal magnitudes can be given by different components of the vector. Example:

x = 8.475	y = 8.000	magnitude = 11.654
x = 10.093	y = 5.827	magnitude = 11.654