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# THE NEWTONIAN MECHANICS IN THE LORENTZ TRANSFORMATIONS

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Abstract

As is known, in the stationary system K and the inertial system K', which is moving towards it, the Lorentz transformations look like this (only for the abscissa and time): x'=(x-v.t)/b; t'=(t-v.x/$c^2$)/b, where b=$\sqrt{1-v^2/c^2}$. We will show here that these expressions are inaccurate as a result of inadmissible mixing of two separate tasks: 1) General task: To find the formulas for the transformation of a random event (x, t) in the event (x', t'). 2) Special task: To find the formulas for the transformation of the "light signal" event ($x_s$, $t_s$) in the "light signal" event ($x_s'$, $t_s'$). The solving of problems (1) and (2) cannot be uniting because the random events occur without connection between the coordinates and time while the coordinates and the time of the signal obey the dependence: $x_s=c.t_s$ ; $x_s'=c.t_s'$, where "s" is the signal index. Videlicet, the Lorentz's transformations reflect the "light signal" case and should be indexed: $x_s'=(x_s-v.t_s)/b$; $t_s'=(t_s-v.x_s/c^2)/b$. In this situation, since $x_s=c.t_s$ ; $x_s'=c.t_s'$ , they can now be solved to the final form: $x_s'=a.x_s/b$; $t_s'=a.t_s/b$, where a=(1-v/c). Only now the index "s" should be removed, to obtain a solution of the general task: x'=a.x/b; t'=a.t/b or x'=x.(a/b); t'=t.(a/b), or x'=x.N; t'=t.N, where N=a/b=$\sqrt{\frac{1-v/c}{1+v/c}}$ . It is in these extreme formulas, each pair of x, t from system K would correspond to a pair of x', t' of system K'. In a word, in the well-known Lorentz's transformations is in force the Newtonian mechanics, namely: x'=(x-Δx)/b; t'=(t-Δt)/b, where v.t=Δx (meters) is the distance at which the moving system K' moves aside by the stationary system K for the time v.x/$c^2$=Δt (seconds), i.e. Δx/Δt=c – the speed of the light signal (there is no a unitary space-time).

Keywords: Special theory of relativity, Lorentz transformations

With this study will make a partial analysis (only of § 3) of an article of A. Einstein dated 1905, from which to appear clearly where and how inconsistencies are admitted in deducing the Lorentz transformations (only for the abscissa and the time): x'=(x-v.t)/b; t'=(t-v.x/$c^2$)/b, where b=$\sqrt{1-v^2/c^2}$. To be most accurate, will follow verbatim author's text, and afford only to change the system (k) of K' and the speed of light V of c (dots indicate skipped non-essential text).

Let's begin with a direct citation of § 3: [1]

"**§ 3. Theory of the Transformation of Co-ordinates and Times from a Stationary System to another System in Uniform Motion of Translation Relatively to the Former**

Let us.....take two systems of co-ordinates.....Let the axes of X of the two systems coincide, and their axes of Y and Z respectively be parallel.....Now to the origin of one of the two systems Κ' let a constant velocity v be imparted in the direction of the increasing x of the other stationary system K.....To any system of values x, y, z, t, which completely defines the place and time of an event in the stationary system, there belongs a system of values x', y', z', t', determining that event relative to the system Κ', and our task is now to find the system of equations connecting these quantities."[1]

This part of the text condition is the general task: To find the formulas for the transformation of a random event (x, t) of a stationary system K, in the event (x', t') by moving toward it inertial system K'. We will explicitly note that random events occur with no relation between the coordinates and time.

Continuation follows, where points are confused:

"From the origin of system Κ' let a ray be emitted at the time t' along the X-axis.....For a ray of light.....x'=c.t'.....At the time t=t'=0, when the origin of the coordinates is common to the two systems, let a spherical wave be emitted therefrom, and be propagated with the velocity c in system K. If (x, y, z) be a point just attained by this wave, then $x^2+y^2+z^2=c^2.t^2$. Transforming this equation with the aid of our equations of transformation we obtain.....$x'^2+y'^2+z'^2=c^2.t'^2$."[1]

This part of the text condition presents the special task: To convert the coordinates and time of a light signal. Here we have to emphasize that these coordinates and time of signal are subject to the known dependence: $x_s=c.t_s$ ; $x_s'=c.t_s'$.

The Theory is ignorant of these two separate problems. It does not realize that the particular case should be differently marked by the general case since the condition with the independent (freely elective) parameters of random events and the condition with interdependent parameters of the event "light signal" simply cannot be merged into a single condition. That aggregation, if performed, will represent arranging of circumstances created by the mind leading points outside of the limits of reality.

The Theory, however, using the same markings, starts just on this route of self-delusion and improvises follows "general dependencies": $x'=c.t'$, respectively, $x'^2+y'^2+z'^2=c^2t'^2$ and $x=c.t$, respectively, $x^2+y^2+z^2=c^2t^2$. While the undeniable truth is that these links will be true and will apply only under indexation "s" of the light signal ($x_s'=c.t_s'$ ; $x_s'^2+y_s'^2+z_s'^2=c^2t_s'^2$ and $x_s=c.t_s$ ; $x_s^2+y_s^2+z_s^2=c^2t_s^2$), i.e. the Lorentz transformations known to us are nothing more than private relationships and it has to be written like this: $x_s'=(x_s-v.t_s)/b$; $t_s'=(t_s-v.x_s/c^2)/b$. However, these equations transforming only the parameters of the light signal are not solved to the end. Since there are links $x_s=c.t_s$ ; $x_s'=c.t_s'$, they apparently must be rationalized to the final form: $x_s'=a.x_s/b$ ; $t_s'=a.t_s/b$, where $a=(1-v/c)$. Only now the index "s" should be removed, to obtain a solution of the general task: $x'=a.x/b$ ; $t'=a.t/b$ or $x'=x.(a/b)$; $t'=t.(a/b)$ or $x'=x.N$; $t'=t.N$, where $N=a/b=\sqrt{\frac{1-v/c}{1+v/c}}$ . It is in these extreme formulas, each pair of x, t from system K would correspond to a pair of x', t' of system K'.

It is in order to pay attention that, through force stress of circumstances, the Special Theory itself at a one moment (& 7, 8)[1] begins to solve just the private task, at which also reaches to the number N – of course, for other parameters of the light signal and without to place the understanding of a "private task".

It remains to clarify one more important detail. For this purpose let set aside the indexation and to write transformations as given by the theory: $x'=(x-v.t)/b$; $t'=(t-v.x/c^2)/b$. Now let's think on the meaning of the terms in parenthesis. As we know, the presence of factor v.t in the conclusion of x' and factor $v.x/c^2$ in the conclusion of t' is interpreted by physics as some inseparable intertwining of spatial and time dimensions, because of which the actions in brackets (x-v.t) and $(t-v.x/c^2)$ cannot be performed, i.e. the mathematics stops to here. In fact, within specified combinations, there's nothing unusual. The Lorentz transformations do not speak about existing of a unitary space-time. At them is in force the Newtonian mechanics, namely: $x'=(x-\Delta x)/b$; $t'=(t-\Delta t)/b$, where $v.t=\Delta x$ (meters) is the distance at which the moving system K' moves aside by the stationary K for the time $v.x/c^2=\Delta t$ (seconds), ie. $\Delta x/\Delta t=c$ – the speed of the light signal.

From the equivalent format: $x'=(x-\Delta x)/b$ ; $t'=(t-\Delta t)/b$ it becomes obvious the fact that the very transformations eliminate displacement of systems through the corrections: $x_{cor}=x-\Delta x$; $t_{cor}=t-\Delta t$ from where $x'=x_{cor}/b$; $t'=t_{cor}/b$, i.e. there is performed a comparison of the parameters of the systems in matched beginning, but keeping all the changes caused by the movement.

In the end, we can make the summary that the transformations, given by the Theory, as a result of confusion give rise to incorrect suggestions and ideas about actual reality.

Reference

1. A. Einstein – ON THE ELECTRODYNAMICS OF MOVING BODIES
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