

ON THE CRITICISM OF EINSTEIN'S SPECIAL RELATIVITY THEORY

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The criticism of special relativity theory (SRT) was often quite confuse (ambiguous) because its authors were not aware of the existence of two theories under the name of SRT, a physical, incipiently outlined in Einstein's original paper on relativity, and an identical mathematical structure to be filled with a variety of hypothetical physical contents -the standard SRT.

The first criticism of Einstein's SRT seems to have come from his collaborators soon after publishing his original paper on relativity [1], most probably due to the appearance of tricks of his decisions to manipulate several mathematical equations in order to deduce the Lorentz transformation (LT) from a thought experiment, and his failing in giving a physical rationale for them. This assertion is supported by Einstein's foundation of SRT on the purely mathematically deduced LT beginning with 1907 [2-4], with the same a priori presumptions (the aether and absolute motion rejection, the constancy of the light speed with respect to any inertial observer) and predictions (the time dilation and length contraction).

My derivation of a new class of time-dependent coordinate transformations, complementary to the spatial translations and rotations, by projecting onto axes of the Cartesian coordinate systems radius vectors traced by physical signals, and of the LT as that of them corresponding to light signals [5-7], proves the correctness of the derivation of the LT in [1]. It discloses the physics underlying Einstein's decisions, but also completes the understanding of the LT. Its terms βx and βt follow to be, respectively, the Cartesian coordinate of a geometrical point in uniform rectilinear motion, and the Newtonian time in which it is traveled by a light signal [5-7], not a precariously defined coordinate x and time t times a factor $[\beta=(1-v^2/c^2)^{-1/2}]$ of mystic nature. Once disclosed the meaning of βt and βx , $v\beta t$ of respectively Newtonian time and Cartesian coordinates of geometrical points ($v\beta t$ corresponding to the origin of the inertial coordinate system with respect to which that point is fixed), the significance of all the terms of the equations constituting the LT is well known. This means that the classical principle of physical determination of equations (which associates physical meaning to each term of any basic mathematical equation under consideration in a field of physics or another) also works in SRT. Since my derivation of the LT in [5-7] enlightened the mathematical 'tricks' in deducing the LT in [1], this principle works only in the SRT outlined in [1] with the ignorance of the claimed time dilation and length contraction, never in a SRT founded on a purely mathematically deduced LT, as it is the standard SRT.

Unfortunately, nobody pointed out, in the course of a century, the existence of two theories under the name of SRT in Einstein's papers and books: an earlier physical one, incompletely embodied in [1], and a later mathematical one -the standard SRT. The last is just a mathematical structure to be filled with, respectively, various hypothetical physical contents (and Einstein filled it with changes in the size and the running of the measuring instruments in uniform rectilinear motion). This happened because:

1. The two theories were built with the a priori rejection of both the coordinate system at absolute rest and the absolute motion (this because Einstein did not understand that the outcome of the Michelson-Morley experiments pointed to the rejection of the Newtonian definition of the absolute speed with respect to a physical 'substratum' in the new theory, no matter of the true existence of the aether or its non-existence.
2. In both theories the time dilation and the length contraction were a priori assumed, together with the light-speed principle (the last in the lack of the coordinate system at absolute rest [5-7]).

3. In both theories Einstein ignored that by light signals were traced radius vectors of geometrical points, as well as that the coordinates of these points along the direction of motion depend on the travel times elapsed along their non-parallel radius vectors [5-7].
4. Because the correct ‘manipulations’ of equations in [1] were done under revelation [6-8], Einstein failed in giving a physical rationale for them, and ended by ignoring the 1905 derivation of the LT.

So the criticism of SRT was/is still mainly focused on the time dilation, length contraction and the traveling of light at constant speed c with respect to any inertial observer. The coincidence of the denominator of some equations of the LT (β) with that of the relativistic mass gave rise -in lack of understanding the subquantum nature of the last [7, 9]- to much confusion between time dilation and the increased lifetimes of the relativistic particles. As concerns the discrepancy between the Newtonian space and time, and the space and time joined together in the standard SRT within the concept of space-time, it was just a false result of the standard SRT. As pointed out in [5-7], the Newtonian space and time are just those joined together within space-time as a consequence of the tracing of radius vectors by light signals. Unfortunately, this could not be seen ignoring that the light signals traced radius vectors.

References

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