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The Special Theory of Relativity – a Confused Thought-Experiment

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Summary

Einstein considered himself the creator of a new “relativistic” physics. Above all he was convinced of having revolutionized the traditional concept of time.

So it is strange that he did not define the concepts of time and clock.

For Einstein as an adherent of the empiristic philosophy of science defining a concept by its “essence” would have been “metaphysics”. But his proposal to define time by the way measurements with clocks are made (or clocks work) is just impossible.

Relativists confuse the concept of time-dilatation with clockwork retardation. Time-dilatation is an untenable idea.

No clock can indicate this famous time-dilatation as clocks indicate the duration of physical processes. If this duration varies, therefore there won't be any variation of the “running” of time itself: Time itself is not a thing, not a real physical process with a variable velocity.

The variable “duration of duration” is a mistake of category as well as “change of change” (Aristotle).

There will be definitions of time and clock. 3 inertial systems in mutual motion perform in 2 different combinations 2 clocks, a clock "in rest" and a clock "in motion" respectively. A clockwork retardation of the mechanical "inertial clock" is impossible because such a retardation would be in contradiction with the definition of inertial systems themselves.

The relativistic retardation of light-clocks cannot be a universal law because the retardation formulas are a function of orientation of velocity v and c vectors, namely: $v \perp c$ or $v \parallel c$.

By the principle of relativity the roles of "rest" and "motion" are interchangeable. For one and the same clock it's impossible to have two different clockwork running speeds, the principle of relativity is already wrong because of this cause. A privileged or preferred coordinate system exists – the universe. The universe is immovable.

Einstein confounded a pure relation of kinematics – the speed of light relative to a moving inertial system – with a "law of light propagation".

Moreover for the purpose of a coordinate transformation the speeds of signals are irrelevant. Among signals light has been chosen arbitrarily.

Einstein on the definition of "time" and "clock"

According to Einstein modern physics is divided into two eras: prerelativistic physics and relativistic physics. Einstein considered himself the creator of revolutionary new theories on time and space which he thought to have meant an end to prerelativistic physics and to have led to relativistic physics.

You must notice with astonishment that the revolutionary of the conception of time failed to define this conception. Einstein was a layman in philosophy. He only adopted three varieties of his time's empiristic-positivistic philosophy of science without criticizing: *Axiomaticism*, *Operationism* and *Instrumentalism*.

Axiomatizism has become famous because of Hilbert's view of geometry. According to him the primordial conceptions of geometry can't be defined explicitly but only "implicitly" by axioms.

Similarly Einstein (1:p 7f): We only have "somewhat unclear knowledge" of the notions: plane, straight line, point. It's no use examining the "truth" of axioms, "for nobody can ask if it's true that two points are linked by only one straight line." In fact if one doesn't define the Euclidian straight line exactly the axioms are nothing but framework conditions that can apply to different "lines". Thus according to Einstein geometry should be regarded "as a branch of Physics", because this would enable physicists to discuss the "truth" of physically interpreted propositions.

According to axiomatizism Einstein uses the term time only with quotation marks: "time", which ought to express that time is an undefinable thus undefined conception.

Operationism claims similarly that the terms of physics can be defined by measurements and experiments only.

Einstein explains his instrumentalism (respective economism) as follows: "Conceptions and systems of conceptions are only meaningful if they help people oversee complexes of experience. There are no other reasons for them. Therefore it has been one of the most harmful actions of philosophers that they have moved some conceptual foundations of science from the realm of the empiristic-useful accessible to control to the unimpeachable level of the logically necessary (the a priori)."

According to Einstein conceptions are “free creations of the human mind” and yet they depend on the the kind of human experience “like clothes on the form of the human body. This especially applies to our ideas about space and time which physicists – forced by facts – have had to remove from the Olymp of the apriori to be able to repair them.” (2: 6)

“... the time-coordinate is defined physically totally unlike the coordinates of space...” (2: 34)

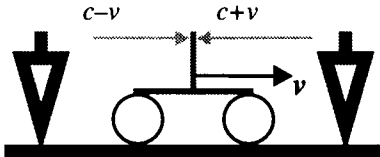
The term “simultaneous” for example only begins to exist after a “method has been found which would allow us to decide by experiments whether two flashes have happened at the same time or not.” (1: 21)

“Therby is also achieved a definition of ”time “in physics. Just imagine three clocks of the same type standing on the 3 points A, B, C of a coordinate system and working in the same way, which means that the position of their indicators are identic at the same time. Then you regard the time of an event as the indication of time (position of the indicators of the clock) by those clocks that are neighbouring (as fare as space is concerned) to the event.” (1: 23)

The position of the indicators of a clock defines what has to be understood about time under no circumstances as well as the conception of money can't be defined neither by examining all coins nor by the way counting machines work.

If someone has no clear ideas about time but only “more or less distinct impressions” like Einstein he tends to become a sacrifice of prescientific poetic anticipations like: The “running” of time, the “course” of time, the “chrono”-meter, the “measurement” of running time,... If time is running, flowing, it is suggested that time has a velocity, a velocity which is variable.

Einstein's motivation for the invention of a variable time-velocity



Einstein's problem with simultaneity

2 events at different places (e. g. 2 lightings) can happen simultaneously. (In German the expression “identisch-zeitig” would be correct – not “gleichzeitig”)

An observer in the middle (as far as space is concerned) of two simultaneous flashes will see them at the same time. But if the observer is situated in a train with the velocity v , the 2 light-signals are not visible at the same time for the velocities of the signals are $c \pm v$ respectively. This fact was called “the relativity of simultaneity” by Einstein. But this relativity does not exist because the educated observer knows that the non-simultaneity of signals can be the result of simultaneous physical events. Einstein confused appearance and reality.

His wrong inference from this: “Events which are simultaneous in relation to the railway track are not simultaneous in relation to the train and vice-versa (relativity of simultaneity). Every reference body (coordinate system) has its particular time; an indication of time has only then a meaning, if the reference body is specified at which the time indication is referred to.

Before the theory of relativity... physics accepted that the meaning of time indications is absolute, e. g. independent of the state of motion of the reference frame.

That this assumption... is not compatible... with the definition of simultaneity... we have seen; dropping this assumption, the conflict between the law of light propagation in the vacuum and the principle of relativity disappears.” (1: 25)

Einstein reached some wrong inferences: 1) The velocities $c \pm v$ of the signals for the observer in the train (v) are a wrong argument for the *train-eigen-time* $\tau(v)$.

2) With the help of the fictitious *eigen time* $\tau(v)$ of the reference system it is possible for him to metamorphose the speed of light ($c \pm v$) relative to the reference system (v) into the famous $c = \text{const.}$, which means an absolute velocity.

The reason for the invention of the revolutionary eigen-time conception $\tau(v)$ was: $(c \pm v) \neq c$. With the invention of this untenable idea of time the impossibility of: $(c \pm v) = c$ becomes possible! One error has made possible a second one.

By the way: With $c = \text{const.}$ the Doppler effect would be impossible. As a result of the globe's motion round the sun there is a Doppler effect for stellar light: $(c \pm v) \neq c$.

Einstein confounded kinematics with law of nature

The Galileo transformations transform coordinates and velocities between 2 reference frames. One frame has the velocity v with respect to the other.

Observers, clocks, signals (light, others) are totally without any respect for the derivation of transformation formulas. The formulation and calculation of time is the same for all reference frames.

The historic origins of the Lorentz transformations are not my topic. The Lorentz transformations are like the Galileo transformations a conversion of coordinates and velocities and therefore (new) kinematics. The axiomatic foundations of the Lorentz transformations are:

1) $(c \pm v) = c \dots$ The speed of light relative to an reference frame is independent of the motion (v) of that frame.

2) Time is relative, every frame of reference has its own variable time $\tau(v)$!

3) Even the space is changeable, this is not my topic.

ad 1) It is an error to use velocities of signals for the derivation of transformation formulas. Moreover, light has been chosen arbitrarily, so why not sound-waves?

Einstein requires that the "*law of light propagation*" according to the principle of relativity applies to all inertial systems ($v = 0$; $v \neq 0$) in the same way.

The relative speed of light is not a law of nature but a kinematical relation. A law of nature is a proposition about relations of physical variables which all refer to a reference frame. Einstein misconceived the kinematics of light, light is also irrelevant for transformations.

ad 2) To relativize time is a mistake that must be built in the transformation formulas, if the principle of relativity should be made compatible with the kinematical contradiction $c \pm v = c$. In physics 2 mistakes don't neutralize themselves.

Einstein sees the essence of his problem clearly: "*Is there any answer to that question which can be thought meaningfully, that according to this answer the law of light propagation in the vacuum does not contradict the principle of relativity?... Is a relation between place and time with respect to both references of frame conceivable in such a way that every ray of light has the same speed of propagation c relative to the railway track **and** relative to the train?*" (1: 28)

The sought magic formula which made an impossibility possible are the Lorentz transformations which introduce "eigen"-times dogmatically for reference frames.

The essential contradiction of the special theory of relativity: $(c \pm v) = c$ produces as follows an error of category: the "running" time $\tau(v)$ for every reference frame. Neither for $(c \pm v) = c$ nor for $\tau(v)$ are experiments possible.

Time and clock

A clock measures the duration of a motion or of a process. A clock does not measure the time or the running of time in their proper sense, because time is not a thing, is not a material process with a speed of running. Clocks don't measure the duration of the motion of time itself but the duration of real processes. The temporality of things is real, not the temporality of time itself!

The duration of a process can vary, the duration itself cannot have a variable duration. Duration of duration, time of time, temporal variation of time,... all these conceptions are categorically wrong. For certain relations it is forbidden to applicate them referring to themselves, because this would be an error of category (Aristotle). Einstein's variable eigen-time is a conceptual misconstruction. This so called time dilatation is totally different from clockwork retardation. The course of a clockwork can vary because of physical causes but therefore the (nonexistent) course of time cannot vary. A clock cannot measure the course of time because it measures motion!

Relativists keep confusing time dilatation and clockwork retardation. This confoundation is the reason for the assertion that experiments with moving clocks can prove time dilatation.

In principle a clock consists of an indicator and a dial (scale) which move relative to each other. A clock measures the duration of the moving indicator on the dial. This duration is compared with events whose duration should be defined.

Inertial clocks

Mechanical clocks on an inertial system in motion run as quickly as clocks in rest. Three inertial systems are given: **S**, **S'** and **I**. **S** is in rest, **S'** has the velocity v , **I** has the velocity u (directions x - and y -axis, respectively). **I** has the function of an indicator. **S** and **I** build a clock in rest, their speed of course is u , their dial is the y -axis.

On the other hand **S'** and **I** build a moving clock with the speed v relative to the clock in rest **S-I**. The indicator of the moving clock is again **I**, y' is the dial.

Since it concerns inertial systems *in vacuo*, the velocities u and v remain *per definitionem* constant. It would be necessary to change the speed of the inertial system **I** (this is the indicator), to change the speed of the clockwork course of the moving clock.

This contradicts the axiom that speeds of inertial systems remain constant. Inertial clocks in motion (one type of mechanical clocks) can't be in retardation.

According to Einstein the inertial system **S'** has another eigen-time with the measure.

$$\tau(v) = t\sqrt{1 - (v/c)^2}$$

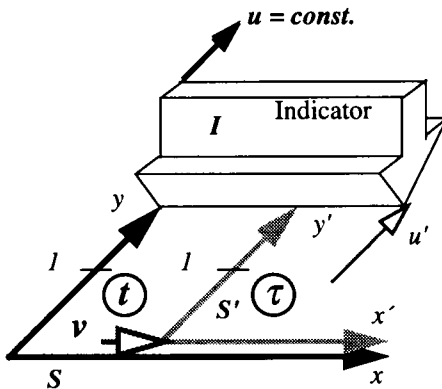
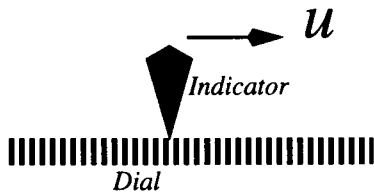
According to Einstein a clock in the system **S'** must have this interval of time.

For $v = c\sqrt{3}/4 \rightarrow \Delta\tau = (\Delta t)/2$ Indications: For **S**: "02", for **S'**: "01"!!!!

Wich means that for the clock **S'-I** the indicator runs half the velocity than it does. According to the Lorentz transformations for **S'** is equal:

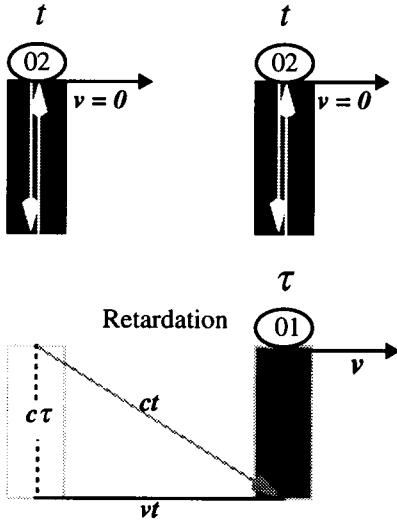
$$y' = y, \Delta y' = \Delta y \quad \text{and} \quad u' = u / (\sqrt{1 - (v/c)^2}) \quad \Delta y' = u'\tau = ut!$$

So you understand the fictitious character of u' and τ .



Relativistic light clocks

In the relativistic literature Feynman's light clock commits excesses. The retardation of its course should prove time dilation which is impossible because even the light clock measures only the duration of the motion of light.



Case A: $v \perp c$ Pythagoras: $\tau(v) = t\sqrt{1 - (v/c)^2}$ ($v = c\sqrt{3/4}$) $\rightarrow \tau(v) = t/2$
 If the clock in rest indicates "02", the moving clock indicates "01". The speed of the light of the moving clock relative to the clock in rest was calculated according to the relativistic addition theorem. (4: 32f)

According to the principle of relativity all inertial systems are *physically* equal, there is no preferred reference system, e. g. a reference system in absolute rest. All laws of nature should have the same form (covariance) in all inertial systems, these are therefore undistinguishable.

The clock in "rest" can also be regarded as a clock in motion. For symmetry there must be 2 clocks in relative motion to 2 other clocks. Regarding the clocks below in rest and the clocks above in motion, we have the retardation for the clocks moved now. They indicate now "01" and in the symmetric case regarded at first they indicated "02"!

But a clock can't run both more slowly and more quickly than a clock for comparison. Therefore the principle of relativity is erroneous even under relativistic suppositions. Kinematical relativity is unlike physical (real) relativity. There is a privileged (preferred) reference frame - the cosmos.

The cosmos is immovable because it has no counterpart for the reference of a motion.



Case B: $v \parallel c$

$$\tau(v) = t(1 - v/c) = t\sqrt{1 - (v/c)^2} \times \sqrt{(1 - v/c) / (1 + v/c)}$$

According to $c = const.$ for all inertial systems the speed of light relative to the x -axis is c . We get another formula for the retardation.

Conclusion: The assertion of a universal law of clock retardation is wrong. I will investigate now another type of clocks:

Case C: Relativistic Doppler clocks

An oscillograph with the velocity v represents a clock in motion. Relativists derived the following formulas ($\beta = v/c$; $\alpha = \sqrt{1 - \beta^2}$; $\gamma = \sqrt{(1 - \beta) / (1 + \beta)}$):

1. $v \parallel c$... the longitudinal Doppler effect: $v' = v\gamma$ or $v' = v/\gamma$ (for $+v$ or $-v$; see 4: 97)
 2. $v \perp c$... the transverse Doppler effect: $v' = v\alpha$ (5: 260)
- (v' , v ... frequencies at the receiver and at the transmitter.)

For relativists, Ives and Stilwell confirmed the transverse Doppler effect by experiment and therefore also time dilation. If this would be true then the relativistic longitudinal Doppler effect would give 2 competitive formulas for the dilatation of time!!



Einstein's errors

- 1) The confounding of kinematics (speed of light relative to a reference frame) with a law of nature. Result: $(c \pm v) = c$, the "absolute" relative velocity.
- 2) The principle of relativity is erroneous. Reference frames are *physically* not equal. There is one preferred reference frame – the universe (or cosmos). The universe is immovable. Real velocities refer to the universe.
- 3) Time dilatation is a conceptual impossibility because there is no "course" of time with a velocity. Time is not a thing. *Temporality* is a *relation*.
- 4) Einstein confounds time dilatation with clockwork retardation.
- 5) Signal velocities are irrelevant for coordinate transformations.

Some alleged verifications of $c \pm v = c$

A) The Michelson/Morley Experiment

- 1) There is no direct measurement of $c \pm v = c$
- 2) Other interpretations are possible.
- 3) Other experimental results are available.

B) The decay of π^0 - mesons.

It is not a problem of kinematics but of experience which speed rays of mesons with high velocity have. This empirical value cannot be a confirmation for the relativistic addition theorem for velocities.

C) The transverse Doppler effect

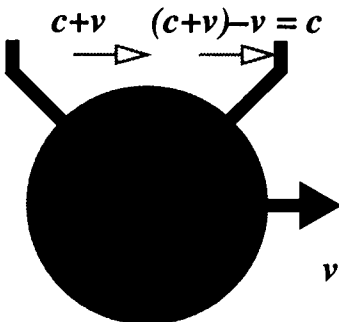
The relativistic interpretation of the transverse Doppler effect cannot be a proof for the Lorentz transformations and for time dilatation, because every retardation of a physical process is another thing than the conceptually impossible time dilatation. The transverse Doppler effect cannot be a proof for a universal law of clock retardation because there are other retardation-formulas, e. g. for the longitudinal Doppler effect.

D) Speed of radio waves

1. supposition: their speed relative to the globe is c . The velocity relative to the receiver on the earth is therefore c .
 2. supposition: the relative velocity of the globe to an "ether" is v . According to Sexl / Schmidt (4: 26) the velocity of the signals relative to the receiver which has the velocity v in the ether is: $c - v$!!
- Since on earth the value is c , Sexl / Schmidt argue that $(c - v) = c$ and that this result is a confirmation of Einsteins kinematics: $c = const.$
- Judging from the measurement c on earth no logic inference to $(c - v) = c$ is possible!

The error in kinematics: If the signal has relative to the globe and relative to the receiver the velocity c , and if the globe is moving relative to the ether with v , then for the ether-reference frame the velocity of the signal relative to the receiver is with *necessity*

$$(c + v) - v = c! \quad (\text{For the signal velocity in the ether is } (c + v))$$



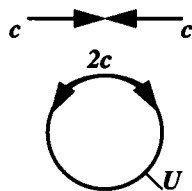
Sexl / Schmidt proved a nonrelativistic physics:

If the speed of light on earth is c , the speed relative to the cosmos is higher than c , if the earth has a velocity relative to the universe.

Therefore $c \neq \text{const.}$ Further: $c \neq v_{\text{max}}$.

4) The earth is a moving radio clock. The rate of retardation is not equal for all directions! For $c \parallel v$ the retardation is greater than for $c \perp v$. This means a "rotation" of the course of the clock in accordance with the rotation of the globe.

Falsification of $c = \text{const.}$



If two light rays encounter, their relative velocity is $2c$. According to Einstein we have to calculate: $c + c = c$.

According to Einstein the 2 rays would encounter each other on a circle with the length U after the interval: $\Delta t = U/c$; with the relative velocity $2c$: $\Delta t = U/2c$

Remark

Some questions concerning the special theory of relativity are not treated: light and inertial systems *in vacuo*, the principle of inertia, space dilatation or contraction. See (3).

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