

Einstein Clock Synchronization Error

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Einstein made the error of defining his clock synchronization so that the clocks are synchronized if they measure light speed as constant in vacuum for inertial frames (under the conditions of Special Relativity (SR)). When really there are various ways of synchronizing clocks. By adjusting his clocks so that light speed is defined as constant, means that he was not allowing the speed of light to be tested to see whether it was constant or not. This totally violates scientific method to have light speed defined as constant rather than allow it to be put to empirical test.

1. Einstein's Synchronization

According to Nicholas Sama [1-2]:

“It has long been believed that the synchronization of spatially separated clocks cannot be accomplished without the use of, and without certain assumptions concerning, light signals or their various equivalents. The first statement of this belief appears to have been made by Einstein, who, in the presentation of his special theory of relativity, categorically denied the possibility of synchronizing a clock at some point *A* with an identical clock at some spatially removed point *B* "...unless we establish *by definition* that the 'time' required by light to travel from *A* to *B* equals the 'time' it requires to travel from *B* to *A*”

Hans C Ohanian notes the issue as [3]:

“Einstein's big mistake he forgot that besides synchronization with light signals there is also synchronization by other methods such as by transported clocks. The synchronization by light signals does not permit us to check whether the one-way speed of light is really constant. But synchronization by other procedures allows us to check whether one-way speed of light is really constant.”

As Ohanian says:

“Any attempt to verify the constancy of the speed of light with these [Einstein] synchronized clocks, would, of course, verify it. But the constancy is built into the

synchronization, and therefore such an attempt would be circular reasoning – like a cat chasing its own tail, it would prove nothing.” [4]

i.e. in Einstein’s SR the speed of light is defined as constant.

Ohanian continues:

“Einstein had deliberately designed his synchronization procedure to hide the effect of the speed of light, because he thought this was the clever and right thing to do. In essence, Einstein’s synchronization procedure was a parlour trick to make the speed of light appear constant, regardless of what the speed ‘really’ is.” [4]

As Ohanian then tells us we can expose this parlour trick by testing synchronization of clocks by other means, for instance by transporting clocks. [4]

Ohanian summarises Einstein Clock synchronization procedure by allegory to this story [5]:

On a large ship. It’s pointed out to the Captain that due to the high speed of the ship relative to the air, the speed of sound signal along the deck is slower when proceeding from stern to bow than from bow to stern. This displeases the Captain- he would prefer that orders he yells from the stern to the bow arrive without extra delay. So he orders his first Engineer: “Forthwith on the deck of this ship the speed of sound from bow to stern shall be the same as the speed from stern to bow. See to it.”

The first Engineer thinks the Captain has gone bonkers; and sets the clock at the bow back by a fraction of a second, a sound signal sent from the stern will appear to arrive at the bow a bit sooner, and the speed will appear to be a bit higher, so as to satisfy the Captain’s command. He resets the clock at the bow by the required amount, and he resets all the clocks elsewhere on deck by smaller amounts, in proportion to their distance from the stern

A passenger finds this strange; she compares her clock with the clock at the stern, and walks forward along the deck, to the bow. She discovers that the clocks at the bow are out of synch.

Ohanian tells us that some physicists spotted his mistake, and instead of treating SR as having defined light speed as constant; they treated it as light speed is constant by postulate.

It is a big difference between “definition” and “postulate”. If you postulate light speed is constant then you can go and test by experiment whether that postulate is true or not. But if you define light speed as constant, then you are setting your measuring instruments to get light speed as constant, and not measuring it.

Einstein made a great many mistakes, his clock synchronization – is one of those mistakes – and it is a very big mistake.

Ohanian tells us: “Einstein’s mistake was first identified explicitly in physics literature by Sir Arthur Eddington..” [6] p 98

“Eddington showed that in special relativity synchronization can be achieved by the slow transport of chronometers and he showed that, in principle, this permits measurement of one-way speed of light.” [6]

At that time it was not practically possible to do such a measurement though, and Ohanian notes:

“Eddington refrained from any overt criticism of Einstein, and did not label Einstein’s mistake as such. This restraint has also been observed by later writers, who proposed synchronization by clock transport or by mechanical signals and implicitly recognized Einstein’s mistake, but always treated him as a sacred cow.” [7]

i.e. they covered up Einstein’s mistake, that’s if they realised it was a mistake.

Then Ohanian tells us:

“Einstein’s interpretation of the constant speed of light as a stipulation was not widely followed by his contemporaries. “ [8]

As Ohanian notes – only Max Born followed the stipulation.

“Most other physicists treated the constant speed of light as a hypothesis subject to experimental verification.” [8]

Pauli took this approach in his relativity book of 1921.

Ohanian notes that:

“Most physicists followed Pauli’s lead [i.e. of treating speed of light as constant as a hypothesis]. They did not criticize Einstein openly, but nevertheless adopted an empirical foundation for relativity taking the constant speed of light as a law of physics, subject to experimental test. They regarded the constant speed of light not as a stipulation, but as a fundamental law of nature, rooted in experiments, just like the principle of relativity is rooted in experiments. ..” [9]

Ohanian notes this is the attitude found in almost all modern textbooks on relativity.

So this is where the big mess occurs—

- * Einstein stipulated light speed as constant.

- * Certain physicists realised this was a mistake and altered what was taught as SR to have constant light speed as a hypothesis.

- *But they did not say that this is what they had done; namely modified what they were calling Einstein’s theory.

- * At the time when they did this it was not possible to measure one-way speed of light by the transported clock method.

* But now it is – and because many physicists are unaware of this cover-up when they do the one-way measurement they use Einstein synchronization and get light speed as constant; but that is only defining the light speed as constant. If they instead did it by transported clock they would get light speed as variable!

The whole mess created by Einstein being treated as a sacred cow.

What we have is two theories (1) where constant light speed is defined and (2) where it is postulated.

Ohanian believes that light speed has been measured constant in the meantime since Einstein made this mess. I cannot see that, because there is in the literature some experiments claiming to measure light speed as constant and others claiming as having measured light speed as variable. The way this could come about is if some experiments are synchronized as per Einstein's method and other experiments by other methods. I think he is confused over the issue of one way and two way light speed measurement. The two way light speed measurement is where light makes a journey and gets reflected back, while one-way measurement would show the speed difference. So the experiments that get variable and do so without Einstein's synchronization must be getting the situation as it really is, without the bodged adjustment to make it constant.

Unfortunately, the Establishment seems to accept the first type of experiment and reject the second. Einstein's synchronization method is totally bogus, but it must be that experiments using this method and getting lightspeed as constant are being accepted. While the experiments that correctly synchronized clocks and get variable light speed get rejected by the Establishment

As previous papers have highlighted the maths that Einstein engaged in was a total mess, and his mess he made with Clock synchronization is what gets experimenters to mess up their experiments and get the maths mess he got. If we do the maths correctly there is no mess and we are back to Newtonian physics and do the experiments correctly we are back to this maths.

Ohanian describes it as Einstein made a stipulation of the speed of light and says:

“Einstein was entitled to make a hypothesis about the speed of light, but not a stipulation. The speed of light is either constant or not, and only measurement can decide what it is. The experimentally testable facts of physics and the computable facts of mathematics cannot be decided by stipulation.” [10]

Ohanian explains that Einstein made this mistake because: “Einstein was not thinking like a physicist, but like a patent clerk.” [11]

“He forgot that in the discussion of the foundations of relativity, he needed to pay attention to principles, not practice.” [11]

So Einstein messed up the maths of his theory and messed up the procedure with how to do experiments.

As noted by Broad and Wade in “Betrayers of the Truth” [12] (a book dealing with fraud in science) Einstein changed the philosophy upon which physics was based. Many others have noted the same.

According to Einstein: “on principle it is quite wrong to try founding a theory on observable magnitudes alone. In reality the very opposite happens. It is the theory which decides what we observe.” [12]

As Broad and Wade note the idea “theory decides what we can observe” is the exact opposite of the test-theory-by-facts methodology that the Philosophy of Science was based upon.

So, now we can see what Einstein thought he was doing – he defined light-speed as constant and told us to adjust our measurements so that light-speed was constant, and he based this on his Philosophy that theory tells us what we observe. But that is complete nonsense – it is not science. It is not a scientific theory. He did not even understand what a scientific theory is supposed to be doing. He did the opposite to what a scientific theory should do when he created his theory. What he has given us is not even science. No wonder it leads to utter confusion, for people who realise that a scientific theory should really be like, when they are presented with Einstein’s non-scientific theory – that is another mess he gives us.

We have to untangle the mess Einstein made when he uses this trick giving us a theory that is not a proper scientific theory.

Synchronization by light signals does not permit us to check whether the one-way speed of light is really constant. But synchronization by other procedures permits us to check whether the one way speed of light is really constant. [11]

So experiment, theory and methodology of physics messed up.

Correct all of this mess and we are back to Newtonian physics with no need of SR. And for the gravitational situation this was all built on SR leading to GR and more mess, correct that mess and we are back to Newtonian gravity theory. Where as I have shown the light bending calculation for Newtonian gravity theory was done wrong in 1919, and hence no need for the new theory of GR in 1919. It was the seeming confirmation of GR in 1919 that led to the associated theory of SR being adopted thereafter; but do the Newtonian calculation correctly and no need for GR in 1919.

Unfortunately on the psychological nature of people – there are supporters of the mess that Einstein made, it is now their misunderstanding of the nature of physics that this mess Einstein gave us can seem to them what physics is supposed to be like. So they defend the mess, and try to prevent anyone cleaning up the mess. As Broad and Wade might put it these people have engaged in self-deception. As Michael Polanyi puts it (though dealing with a different issue in SR) for those who have accepted Einstein’s world-view it is almost impossible to put that way of thinking aside and think again in different terms. [13]

i.e. the ultimate mess that Einstein has given us is that he has messed with peoples' minds.

Anyway, I shall now go through the physics theory and the maths:

2. Galilean Relativity

Einstein was not that good at maths at school, but when he became famous; the Publicity campaign started to try to portrayed him as a mathematical genius.

As you must be aware it is possible to write mathematical nonsense proving $1=0$ or anything else, if you don't understand the trap you can fall into by division by zero.

For example:

- (1) start with $1=1$
- (2) now let $x=1$
- (3) take away 1 from both sides: $x-1=1-1$
- (4) $x-1=0$
- (5) divide both sides by $x-1$
- (6) $1=0/(x-1)=0$
- (7) So $1=0$

This derivation (1)-(7) is nonsense; mathematical nonsense; for a start $x-1=0$ so $0/(x-1)=0/0$ and that is undefined, but alot people falsely believe $0/0$ equals zero.

Another example of mathematical nonsense showing $1=2$ from a maths site [14]:

The Fallacious Proof:

Step 1: Let $a=b$.

Step 2: Then $a^2 = ab$ (by multiplying through by a)

Step 3: $a^2 + a^2 = ab + a^2$ (by adding a^2 to both sides)

Step 4: $2a^2 = ab + a^2$

Step 5: $2a^2 - 2ab = ab + a^2 - 2ab$ (subtract $2ab$ from both sides)

Step 6: and $2a^2 - 2ab = a^2 - ab$

Step 7: This can be written as $2(a^2 - ab) = 1(a^2 - ab)$

Step 8: and cancelling the $a^2 - ab$ from both sides gives $1=2$.

That is what Einstein does. He does nonsense, just he writes his nonsense in maths form.

Now - the Psychological aspect is -- a great many people are bad at maths-- and they can't tell bad use of maths from good use of maths.

So when Einstein writes nonsense as maths; these people can't tell whether it's correct or not (because they can't tell the difference between nonsense-maths and good maths).

So when the Publicity Campaign starts going that Einstein is a mathematical genius; well these people can't understand maths anyway, and just take the word of the publicity campaign.

Now on the issue that Einstein was tackling -- there was a lot of problems getting the maths of the theories to match the latest things that was coming through from experiments. And so Einstein presented his solution of getting the maths sorted-- just write mathematical nonsense then the maths is joined. i.e. in early 20th Century -- physics was facing a crisis with its maths and couldn't join all the various bits together; so Einstein a dunce at maths just presents the solution which turns out to be a non-solution of just write nonsense for the maths. When you have $1=1$ and you want $2=2$ use the trick of $0/0$ to get $1=2$.

When we look at the light equation

$$x^2 = c^2 t^2 \quad \text{in the unprimed frame (1)}$$

and

$$x'^2 = c^2 t'^2 \quad \text{in the primed frame (2)}$$

(let's not bother with delta for interval etc.)

Einstein wants these two equations to be equal.

i.e. he wants the distance that the primed observer sees light travel to match what the unprimed observer sees.

So he makes both equal 0.

He writes

$$x^2 - c^2 t^2 = 0 \quad (1a)$$

and

$$x'^2 - c^2 t'^2 = 0 \quad (2a)$$

he then equates (1a) and (2a)

$$x^2 - c^2 t^2 = x'^2 - c^2 t'^2 \quad (3)$$

and he can then proceed with the $0/0$ trick to write nonsense to get his Lorentz transformation equations.

(1a) could be say for example $x^2 = 1$ then it is $1 - 1 = 0$

(2a) could be for example $x'^2 = 2$ then it is $2 - 2 = 0$

So he is then looking for some transform that converts 1 into 2

$$1 = \text{transformation} * 2$$

and he does this twice; once for distance and once for time interval

$$\text{distance } x' = \text{transformation} * \text{distance } x$$

$$\text{time interval } t' = \text{transformation} * \text{time interval } t$$

He could have bodged it anyway he liked and come up with any transformation he liked; but he bodged it a certain way and got the Lorentz transformation.

That is the Legacy that Einstein left our modern physics.

However, the “real” solution is -- just do the maths correctly and it’s still Newtonian Physics.

For instance for

$$x - ct = 0$$

and if you are considering the conversion of $x' = x - vt$

$$\text{then } x' - (x-vt) = 0$$

$$\text{subst } x = ct, \text{ so } x' - (c-v)t = 0$$

Summary

$$x - ct = 0 \text{ in unprimed frame}$$

$$x' - (c-v)t = 0 \text{ in primed frame}$$

$$\text{connected by } x' = x - vt$$

AND that is Galilean Relativity when you do it properly.

But Einstein did not do Galilean Relativity properly, instead he did his usual bodge with the maths and went:

$$x - ct = 0 \text{ (a)}$$

$$x' - ct' = 0 \text{ (b)}$$

(actually is sometimes squared in this type of derivation; but omitting for simplicity)

use $x' = x - vt$ in (b) gives

$$x - vt - ct' = 0$$

and from (a) $x - ct = 0$ so we have $-vt = 0$

and he thinks that can't be right, both v and t are non-zero

So bad maths leads him to falsely conclude Galilean relativity does not work. He then proceeds to bodge things to get SR.

Everything Einstein touches he messes up.

His 1905 paper on SR gets published, and gets ignored. Then in 1919 he becomes famous and declared by the publicity campaign as a mathematical genius etc. So, physicists then think well there must be "something" in his SR because it is supposedly proved to have been experimentally confirmed. But really its just garbage- - someone not able to understand maths just writing nonsense for maths. This then ties the Physics Establishment to deal with the maths in the same way.

Up to Einstein Revolution maths was supposed to be the "Queen of the Sciences" - i.e dictating what could be written as physics equations. After Einstein-- maths became the servant of science; where physicists could abuse her in any way they liked so long as the maths could be abused to fit experimental data, it no longer mattered whether the maths was mathematically coherent obeying good maths rules and procedures.

Bernhard Rothenstein and Stefan Popescu in their article "Lorentz transformations: Einstein's derivation simplified" start the article saying: "Those who have studied Einstein's special relativity theory know that everything there is the result of his two postulates and of the distant clock synchronization procedure that he proposed." [15]

That is a Revision to Special Relativity; because in most standard texts on SR they state SR is based upon two postulates. (See for example Introduction to Modern Physics [16])

i.e Rothenstein and Popescu version of SR is not that is usually taught. It does equate fairly well to what Einstein claimed was SR. But what Einstein claimed was SR was revised in secret, because it was known to be erroneous, and the reason it is erroneous is because Einstein clock synchronization method is not a principle of physics; clocks can be synchronized by other means; and a physics theory should be based upon principles.

It high-lights the issue – that there is a mess of confusion when dealing with SR as to which version of SR that people are actually referring to, because there are many versions.

Rothenstein and Popescu then proceed in their paper to equate:
 $x^2 - c^2 t^2 = 0$ with $x'^2 - c^2 t'^2 = 0$ to give $x^2 - c^2 t^2 = x'^2 - c^2 t'^2$
This gives problems with $0 = 0$ as has been dealt with in previous papers.

I have found others that go into detail about this, such as Thomas Smid in his article "Mathematical Inconsistencies in Einstein's derivation of the Lorentz transformation". [17] Where he points out based on Einstein's Simple Derivation of the Lorentz Transformation [18] is actually based on $x - ct = 0$ equated to $x' - ct' = 0$.

The additional problems caused by dealing with $x^2 = c^2 t^2$ and $x'^2 = c^2 t'^2$ is dealt with by Smid in his article: “Regarding the 'Light Sphere' Derivation of the Lorentz Transformation.” [19]

I shall leave the final words to Essen. On this issue of synchronization Essen points out the problem:

“There were definite errors [of Einstein] about which there can be no argument. One was the assumption that the velocity of light is constant. This is contrary to the foundations of science and the fact that it is repeated in all the textbooks I have seen, shows how little these foundations are understood by theoretical physicists. Science is based on the results of experiment and these results must be expressed in a single coherent set of units. [*] The unit of length was the metre and the unit of time was the second. Velocity was a measured quantity as so many metres per second. Even though it was found to be constant under certain conditions, it was quite wrong to make it a constant by definition under all conditions. Only the unit of measurement can be made constant by definition and Einstein’s assumption constituted a duplication of units. It was this duplication that led to puzzling and contradictory results and not the profundity of the theory as relativists like us to believe. ”

“The question of units is a rather complicated one; and in this instance some writers are confused by the fact that the velocity of light is now often used as a standard, distances being calculated from the time of travel of a pulse of light or radio waves; but the value used is the measured value and the conditions of measurement are carefully defined. Quite recently a further complication has arisen. At the end of our work at the NPL [National Physical Laboratory] we made the suggestion that as the techniques improved it might be advantageous to redefine the units of measurement, keeping the atomic second, giving a defined value to the velocity of light and discarding the unit of length. This has now been done, but these developments do not affect the criticisms of the theory. Even with these units it would still be absurd to assume that the velocity would be the same for two observers in relative motion. Units must be used with common sense.” [20]

[*] i.e. Essen is pointing out that science/physics is based on empirical evidence; and as pointed out Einstein erroneously abandoned that.

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