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Reconsidering Time Dilation of Special Theory of Relativity

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Abstract: *In classical Newtonian physics, the concept of time is absolute. With his theory of relativity, Einstein proved that time is not absolute, through time dilation. According to the special theory of relativity, time dilation is a difference in the elapsed time measured by two observers, either due to a velocity difference relative to each other. As a result a clock that is moving relative to an observer will be measured to tick slower than a clock that is at rest in the observer's own frame of reference. Through some thought experiments, Einstein proved the time dilation. Here in this article I will use my thought experiments to demonstrate that time dilation is incorrect and it was a great mistake of Einstein.*

1. Introduction

A central tenet of special relativity is the idea that the experience of time is a local phenomenon. Each object at a point in space can have it's own version of time which may run faster or slower than at other objects elsewhere. Relative changes in the experience of time are said to happen when one object moves toward or away from other object. This is called time dilation. But this is wrong.

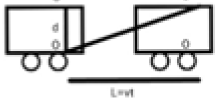
Einstein's relativity was based on two postulates:

1. The principle of relativity: The laws of physics must be the same in all inertial frames.
2. The constancy of the speed of light: The speed of light in vacuum has the same value, c, in all inertial frames, regardless of the velocity of the observer or the velocity of the source emitting the light.

Based on these two postulates and through some thoughts experiments, Einstein proved the time dilation. But based on these two postulates and through some thought experiments, it is possible to prove that time dilation is wrong. So, a clock that is moving relative to an observer will be measured to tick same with a clock that is at rest in the observer's own frame of reference. That's why the experience of time is not a local phenomenon and time is absolute.

2. Time Dilation

To discuss time dilation, we first have to imagine that an observer is sitting on a moving train with a clock. Standing at the platform and looking at that clock, another observer is trying to measure his own time. The clock will be different. It has two points o and o'. The point o is bellow and another point o' is above it. The distance from o to o' is d. A pulse of light will go from o to o' and then it will be vanished. At that moment another pulse of light will start again to go from o to o'. In this way it will continue. The train is moving at a speed of v. The observer sitting on the moving train will see that the pulse of light is going straightly from o to o'. So, he will measure his time



$$t' = d/c \tag{1}$$

Figure1. *(a) The observer sitting on the train will see that the pulse of light is going from o to o' and getting vanished. (b) The observer standing at the platform will see when the pulse of light will go from o to o', o' will not be in it's own place. It will move to right.*

As the train is going at a speed of v, the observer standing at the platform will see that the another observer and the clock both are going at the speed of v too. The observer standing at the platform will also see when the pulse of light will go from o to o', o' will move to L distance for the speed of the train. As a result, the pulse of light has to overcome a little extra distance. According to the Pythagorean theorem the distance will be,

$\sqrt{(L^2+d^2)}$

As the speed of light in vacuum has the same value, c, in all inertial frames, the observer standing at the platform will measure his time,

$t= \sqrt{(L^2+d^2)}/c$ [2]

Here L is the distance which is crossed by the at a speed of v. The train takes the time t to cross the distance. So,

$L = v\,t$ [3]

By combining Eq. [2] and Eq.[3] we get,

$t = \sqrt{(v^2t^2+d^2)}/c$

$\Rightarrow c^2t^2 = v^2t^2+d^2$

$\Rightarrow c^2t^2-v^2t^2 = d^2$

$\Rightarrow t^2(c^2-v^2) = d^2$

$\Rightarrow t^2 = d^2/(c^2-v^2)$

$\Rightarrow t = d/\sqrt{(c^2-v^2)}$

$\Rightarrow t = (d/c)/\{\sqrt{(c^2-v^2)}/c\}$ [4]

By combining Eq.[1] and Eq.[4] we arrive at the time dilation formula,

$t= t'/\sqrt{(1-v^2/c^2)}$

This equation shows that the regular time, t, is always larger than or equal to the proper(original) time t'. This result states that the time interval as measure by an observer in a stationary frame is longer than the one measured by an observer in a moving frame.

3. PRESENTING TIME DILATION IS WRONG

To prove time dilation wrong we have to do two thought experiments. We have to base on the two postulates of relativity to do these experiments.

Experiment 1

To do this experiment we first have to imagine that an observer is sitting on a moving train with a clock. Standing at the platform and looking at the clock, another observer is trying to measure his own time. The clock will be different. It has two points alongside o and o'. o' will be on the right side of o. The distance from o to o' is d. A pulse of light will go from o to o' and then it will be vanished. At that moment, another pulse of light will start again to go from o to o'. In this way it will continue. The train is moving at a speed of v. The observer sitting on the moving train will measure his time, $t= d/c$ [1]

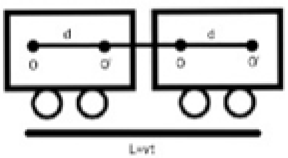


Figure2. *(a) The observer sitting on the moving train will see that the pulse of light is going from o to o' and getting vanished.*

(b) Another observer will see when the pulse of light will go from o to o', o' will not be in it's own place. It will move to right.

As a result, the observer standing at the platform will see when the pulse of light will go from o to o', o' will move to L distance for the speed of the train. So, the pulse of light has to overcome a little extra distance. The distance will be, $d + L$

As the speed of light in vacuum has the same value, c, in all inertial frames, the observer standing at the platform will measure his time,

$t=(d + L)/c$[2]

Here, $L = v t$ [3]

By combining Eq.[2] and Eq.[3] we get,

$t = (d + v t)/c$

$\Rightarrow c t = d + v t$

$\Rightarrow c t - v t = d$

$\Rightarrow t(c-v) = d$

$\Rightarrow t = d/(c-v)$

$\Rightarrow t = (d/c)/\{(c-v)/c\}$ [4]

By combining Eq.[1] and Eq.[4] we get,

$t = t'/(1-v/c)$ [5]

But according to the special theory of relativity, the observer standing at the platform will measure his time,

$t= t'/\sqrt{(1-v^2/c^2)}$[6]

Here,Eq.[5] $\neq$ Eq.[6]

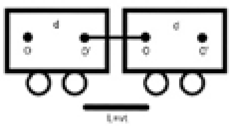


Figure3. *The observer standing at the platform will see when the pulse of light will go from o to o', o' will not be in it's own place. It will move to left.*

Again, suppose this train going backward.

As a result, the pulse of light has to overcome a little less distance. The distance will be,

$d - v t$

So, the observer standing at the platform will measure his time, $t = (d - v t)/c$

$\Rightarrow c t = d - v t$

$\Rightarrow c t + v t = d$

$\Rightarrow t(c + v) = d$

$\Rightarrow t = d/(c + v)$

$\Rightarrow t = t'/(1+v/c)$ [7]

Here, Eq.[5] $\neq$ Eq.[7]

Here, when the clock is vertical, the observer standing at the platform measures his time $t = t'/\sqrt{(1-v^2/c^2)}$.When the clock is parallel to the floor of the train and goes forward that observer measures his time $t = t'/(1-v/c)$. Again, when the train goes backward the same observer measures his time $t = t'/(1+v/c)$. The observer standing at the platform measures his time differently because of the position of the clock and the direction of the speed of the train. So, time can not be naturally slow and time dilation is completely wrong.

Experiment 2

We first have to imagine that an observer is standing at the platform with a clock. Sitting on a moving train and looking at that clock, another observer is trying to measure his own time. The clock has two points o and o'. The point o is bellow and another point o' is above it. The distance from o to o' is d. A pulse of light will go from o to o' and then it will be vanished. The observer standing at the platform will see that the pulse of light is going straightly from o to o'. So, he will measure his time, $t = d/c$ [1]

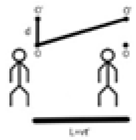


Figure4. *The observer sitting on the moving train will see that he is stationary and another observer is moving with his clock. He will also see when the pulse of light will go from o to o', o' will not be in it's own place. It will move to right.*

The observer sitting on the moving train will see when the pulse of light will go from o to o', o' will move to L distance. As a result the pulse of light has to overcome a little extra distance. According to the Pythagorean theorem the distance will be,

$\sqrt{(L^2+d^2)}$

As the speed of light in vacuum has the same value, c, in all inertial frames, the observer sitting on the moving train will measure his time,

$t = \sqrt{(L^2+d^2)}/c$ [2]

Here, $L = v\,t'$

So, $t' = \sqrt{(v^2t'^2+d^2)}/c$

$\Rightarrow c^2t'^2 = v^2t'^2 + d^2$

$\Rightarrow c^2t'^2 - v^2t'^2 = d^2$

$\Rightarrow t'^2(c^2-v^2) = d^2$

$\Rightarrow t' = d/\sqrt{(c^2-v^2)}$

$\Rightarrow t' = (d/c)/\{(c^2-v^2)/c\}$ [3]

By combining Eq.[1] and Eq.[3] we get,

$t' = t/\sqrt{(1-v^2/c^2)}$

But according to the special theory of relativity, the observer sitting on the moving train measured his time $t' = d/c$ and another observer standing at the platform measured his time $t = t'/\sqrt{(1-v^2/c^2)}$.

That’s why $t = t'$. If the observer standing at the platform measure his time to see the clock which is on the moving train and another observer sitting on the moving train measure his time to see the clock which is at the platform, they will measure their time same. So time can not be different for any observer.

4. DISCUSSION

In 1905, Einstein gave his special theory of relativity. In his theory, through time dilation Einstein proved that there is no standard time, every time is local time. He said that time is an illusion. So time will be different for different observer. If any observer moves faster his time will be slow. Einstein proved the time dilation based on some thought experiments. Bit we have seen that through some thought experiment it is possible to prove that time dilation is wrong. Time is always same in all observer's reference frames. We have seen that the observer measure his own time differently because of the position of the clock and the direction of the speed of the train. When the train is vertical the observer will measure his time $t= t'/\sqrt{(1-v^2/c^2)}$. If the same clock is parallel to the floor of the train, the same observer will measure his time $t = t'/(1-v/c)$ or $t = t'/(1+v/c)$. But it is not possible. So time is absolute for all observers. In reality, there will never be such a change in time. There is no real evidence of time dilation. Now it is clear to us that in reality it will never happen. So time is not an illusion and there is a standard time.

5. CONCLUSION

According to the special theory of relativity, time dilation is a difference in the elapsed time measured by two observer, either due to a velocity different relative to each other. But it is not true. It is no matter whether an object is moving or not, his time will be always same. In other words, a stationary observer will measure his time same with the moving observer. If we stop our eyes, we will not see anything. It does not mean that there is nothing. Time dilation is like this. Time will not be naturally slow. If we move faster our time will not change. In classical Newtonian physics, time is absolute and this is true. Einstein mathematically proved the time dilation. But we have seen that mathematically time dilation is wrong. So Einstein was very much wrong.

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