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# Some Problems Found in the Proof of Lorentz Transformation

LIU Haijun
Shanxi Chemical Research Institute, Taiyuan City, China

This paper points out some problems found in the proof of Lorentz transformation. First of all, time is a physical quantity, is artificially defined, is an abstract concept. The clock is just one of the many tools used to measure time, which have been replaced by more advanced and accurate devices. Using the reading of a clock to indicate the time of a point in the space is only an approximation, which is convenient for people's daily life, work, and research. In theory, the two are not equivalent. The time of space is fixed and does not vary with different readings from different instruments. Second, it is an axiom of physics that all positions in the universe are simultaneous. Any action to prove the axioms of science is unnecessary, circular, and meaningless. Some other questions are raised together, for teachers and scholars to criticize and correct to make the proof of the Lorentz transformation more complete and more systematic so that more people can understand it, know it, and apply it.

*Keywords:* simultaneity, dynamic system, static system, Lorentz transformation

## Introduction

The greatest invention of modern physics is relativity. And at the heart of relativity is the Lorentz transformation. The theory of relativity was first proposed by Albert Einstein, who is known as the greatest physicist in the history of the world. As we all know, no one is perfect, and no scientific theory is perfect. Einstein was no exception. Relativity is no exception. Now, let's list Einstein's errors in proving the Lorentz transformation as follows (Einstein, 2017; Einstein, 2019; Liu, 2022a, 2022b, 2022c).

## Does Such Light Exist?

$$x' = ct'$$

This formula doesn't exist at all. The light it represents doesn't exist at all. Relativity says it's the distance an optical signal travels in an inertial frame of motion. We all know that the origin of the moving system and the end of the light signal are always the same, they are always at the same time. There has never been such an event in the world where an optical signal can simultaneously move from one point to another.

## Do the Two Rays Have the Same Range?

Light rays moving in the positive direction of the X axis:

$$\begin{cases} x - ct = 0 & (x \geqslant 0, \forall t \geqslant 0) \\ x' - ct' = 0 & (x' \geqslant 0, \forall t' \geqslant 0) \end{cases}$$

Light rays moving in the negative direction of the X axis:

LIU Haijun, Senior Engineer, Shanxi Chemical Research Institute, Taiyuan City, Shanxi Province, China.

$$\begin{cases} x + ct = 0 & (x \leqslant 0, \forall t \geqslant 0) \\ x' + ct' = 0 & (x' \leqslant 0, \forall t' \geqslant 0) \end{cases}$$

For the range of the two rays, one is positive, one is negative. They're two completely different rays.

## What Is the Solution of the Simultaneous Equations of the First Two Rays?

$$\begin{cases} x - ct = 0 \\ x' - ct' = 0 \\ x + ct = 0 \\ x' + ct' = 0 \end{cases}$$

This four-member first homogeneous system has a unique zero solution.

$$\begin{cases} x = 0 \\ t = 0 \\ x' = 0 \\ t' = 0 \end{cases}$$

## Logical Proof Method

$$(x' \geqslant 0 \wedge x' \leqslant 0) \Rightarrow (x' = 0) \wedge (x' = ct') \Rightarrow (t' = 0)$$

$$(x \geqslant 0 \wedge x \leqslant 0) \Rightarrow (x = 0) \wedge (x = ct) \Rightarrow (t = 0)$$

$$\begin{cases} x = 0 \\ t = 0 \\ x' = 0 \\ t' = 0 \end{cases}$$

## Proof Method of Linear Algebra

$$\begin{cases} x - ct = 0 \\ x' - ct' = 0 \\ x + ct = 0 \\ x' + ct' = 0 \end{cases} = \begin{cases} x - ct + 0 + 0 = 0 \\ 0 + 0 + x' - ct' = 0 \\ x + ct + 0 + 0 = 0 \\ 0 + 0 + x' + ct' = 0 \end{cases}$$

$$\begin{pmatrix} 1 & -c & 0 & 0 \\ 0 & 0 & 1 & -c \\ 1 & c & 0 & 0 \\ 0 & 0 & 1 & c \end{pmatrix} = \begin{pmatrix} 1 & -1 & 0 & 0 \\ 0 & 0 & 1 & -1 \\ 1 & 1 & 0 & 0 \\ 0 & 0 & 1 & 1 \end{pmatrix} = \begin{pmatrix} 1 & -1 & 0 & 0 \\ 0 & 2 & 0 & 0 \\ 0 & 0 & 1 & -1 \\ 0 & 0 & 0 & 2 \end{pmatrix} = \begin{pmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{pmatrix}$$

$$\begin{vmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{vmatrix} = 1 \neq 0$$

$$\begin{cases} x = 0 \\ t = 0 \\ x' = 0 \\ t' = 0 \end{cases}$$

**Does It Make Sense to Operate in an All-0 Expression?**

$$\begin{cases} (x' - ct') = \lambda (x - ct) \\ (x' + ct') = \mu (x + ct) \end{cases} \Leftrightarrow \begin{cases} (0 - c \cdot 0) = \lambda (0 - c \cdot 0) \\ (0 + c \cdot 0) = \mu (0 + c \cdot 0) \end{cases} \Leftrightarrow \begin{cases} 0 = \lambda \cdot 0 \quad (\lambda \neq 0) \\ 0 = \mu \cdot 0 \quad (\mu \neq 0) \end{cases}$$

$$\begin{cases} a = \dfrac{\lambda + \mu}{2} \\ b = \dfrac{\lambda - \mu}{2} \end{cases}$$

$$\begin{cases} x' = ax - bct \\ t' = act - bx \end{cases} \Leftrightarrow \begin{cases} 0 = a \cdot 0 - bc \cdot 0 \\ 0 = ac \cdot 0 - b \cdot 0 \end{cases} \Leftrightarrow \begin{cases} 0 = 0 \\ 0 = 0 \end{cases}$$

**Do These Two Equations Exist?**

$$\begin{cases} (x' - ct') = \lambda (x - ct) \\ (x' + ct') = \mu (x + ct) \end{cases}$$

$$\begin{cases} x' = ax - bct \\ t' = act - bx \end{cases}$$

These two equations, they don't exist. Because if and only if,

$$\begin{cases} x = 0 \\ t = 0 \\ x' = 0 \\ t' = 0 \end{cases}$$

That is, the system only works if $x'$, $t'$, $x$, $t$ are all equal to 0. Such a system of equations makes neither physical nor mathematical sense.

**Is This Relationship True?**

$$\begin{cases} x' = 0 \wedge t' \neq 0 \wedge t \neq 0 \wedge x \neq 0 \\ x' = ax - bct \Rightarrow x = \dfrac{bc}{a} t \Rightarrow v = \dfrac{bc}{a} \end{cases}$$

$$\begin{cases} x = ct \\ x = \dfrac{bc}{a}t = vt \end{cases} \Rightarrow \begin{cases} v = c \\ \dfrac{b}{a} = 1 \Rightarrow \mu = 0\,(\mu \neq 0) \end{cases}$$

$$\begin{cases} x = 0 \\ t = 0 \\ x' = 0 \\ t' = 0 \end{cases}$$

The above relation simply does not hold.

## Does This Relationship Hold?

$$\begin{cases} t = 0 \wedge t' \neq 0 \wedge x \neq 0 \wedge x' \neq 0 \\ x' = ax - bct \Rightarrow x' = ax \Rightarrow \Delta x' = a\Delta x \end{cases}$$

$$\begin{cases} \Delta x' = 1 \\ \Delta x = \dfrac{1}{a}\Delta x' \end{cases} \Rightarrow \Delta x = \frac{1}{a}$$

$$t = 0 \xrightarrow{(At\ zero, the\ moving\ inertial\ frame\ starts\ from\ the\ origin\ of\ the\ stationary\ inertial\ frame)} t' = 0$$

$$t = 0 \xrightarrow{(x=ct)} x = 0$$

$$t' = 0 \xrightarrow{(x'=ct')} x' = 0$$

The above relation simply does not hold.

## Is This Relationship True?

$$\begin{cases} t' = 0 \wedge t \neq 0 \wedge x' \neq 0 \wedge x \neq 0 \\ v = \dfrac{bc}{a} \Rightarrow \dfrac{b}{a} = \dfrac{v}{c} \\ ct' = act - bx \Rightarrow bct = \dfrac{b^2}{a}x \\ x' = ax - bct = a\left(1 - \dfrac{v^2}{c^2}\right)x \Rightarrow \Delta x' = a\left(1 - \dfrac{v^2}{c^2}\right)\Delta x \end{cases}$$

$$\begin{cases} \Delta x = 1 \\ \Delta x' = a\left(1 - \dfrac{v^2}{c^2}\right)\Delta x \end{cases} \Rightarrow \Delta x' = a\left(1 - \frac{v^2}{c^2}\right)$$

$$t' = 0 \xrightarrow{(At\ zero, the\ moving\ inertial\ frame\ starts\ from\ the\ origin\ of\ the\ stationary\ inertial\ frame)} t = 0$$

$$t' = 0 \xrightarrow{(x'=ct')} x' = 0, t = 0 \xrightarrow{(x=ct)} x = 0$$

The above relation simply does not hold.

## Is This the Right Derivation?

$$\begin{cases} t = 0, x' = ax \\ \Delta x' = 1 \Rightarrow \Delta x = \dfrac{1}{a}\Delta x' \Rightarrow \Delta x = \dfrac{1}{a} \\ t' = 0, x' = a\left(1 - \dfrac{v^2}{c^2}\right)x \\ \Delta x = 1 \Rightarrow \Delta x' = a\left(1 - \dfrac{v^2}{c^2}\right)\Delta x \Rightarrow \Delta x' = a\left(1 - \dfrac{v^2}{c^2}\right) \end{cases} \xrightarrow[(\Delta x = \Delta x')]{(\Delta x' = \Delta x = 1)} a = \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}}$$

$$x' = ax - bct = a\left(x - \frac{bc}{a}t\right) = \frac{x - vt}{\sqrt{1 - \frac{v^2}{c^2}}}$$

$$ct' = act - bx \Rightarrow t' = a\left(t - \frac{b}{a}\cdot\frac{1}{c}\cdot x\right) = \frac{t - \frac{v}{c^2}x}{\sqrt{1 - \frac{v^2}{c^2}}}$$

$$t = 0 \Rightarrow \Delta x' = \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}}\cdot\Delta x, t' = 0 \Rightarrow \Delta x' = \sqrt{1 - \frac{v^2}{c^2}}\cdot\Delta x$$

$$t = 0 \wedge t' = 0 \Rightarrow \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}} = \sqrt{1 - \frac{v^2}{c^2}} \Rightarrow v = 0 \Rightarrow b = 0 \Rightarrow \lambda = \mu$$

The above relation simply does not hold. The Lorentz transformation is fundamentally wrong.

## Are Simultaneous Different Events Linear Space?

The Lorentz transformation requires that the transformation coordinates of the two coordinate systems be injective, surjective, bijective. Otherwise, the transformation doesn’t make any mathematical sense. So the basic condition is that space-time has to be linear.

At the same time, different events: students sit one meter apart in the classroom.

$$\begin{cases} x_1 = 1, x_2 = 2, x_3 = 3, ...x_n = n | 1 \leqslant n \leqslant 30 \\ t_1 = t_2 = t_3 = ... = t_n = t | 1 \leqslant n \leqslant 30, t \geqslant 0 \end{cases}$$

$$x_1 + x_2 = x_3 = 3$$

$$t_1 + t_2 = 2t \neq t_3$$

Time is not closed to addition, spacetime is not linear space, Lorentz transformations don't work, they don't make any mathematical sense.

## Are Events in the Same Place and Different Time Linear Space?

Same place and different time: From 1982 to 1986, a student in Guangzhou South China University of Technology completed the freshman, sophomore, junior, senior, full-time undergraduate study process.

$$\begin{cases} t_1 = 1 \\ t_2 = 2 \\ t_3 = 3 \\ t_4 = 4 \\ x_1 = x_2 = x_3 = x_4 = x \mid x \geqslant 0 \end{cases}$$

$$t_1 + t_2 = t_3 = 3$$

$$x_1 + x_2 = 2x \neq x_3$$

Space is not closed to addition, space and time are not linear spaces, Lorentz transformations are not valid, they don't make any mathematical sense.

## Are Events of Different Time and Places Linear Spaces?

Events of different time and place (random, non-uniform particle motion):

$$\begin{cases} \cdots, t_m, \cdots, t_n, \cdots, t_r, \cdots \mid m, n, r \in \mathbf{N}, m < n < r \\ \cdots, x_m, \cdots, x_n, \cdots, x_r, \cdots \mid m, n, r \in \mathbf{N}, m < n < r \\ t_r = t_m + t_n \mid \forall t > 0 \\ x_m = k_m t_m = \left(k_r + k_p\right) t_m \mid \forall x > 0, \exists k > 0 \\ x_n = k_n t_n = \left(k_r + k_q\right) t_n \mid \exists k_m > k_n > k_r, k_m \neq k_n \neq k_r \\ x_r = k_r t_r = \left(x_m + x_n\right) - \left(k_p t_m + k_q t_n\right) \mid \exists k_p \nleq 0, k_q \nleq 0 \\ x_r \neq x_m + x_n \mid \exists k_p t_m > 0, k_q t_n > 0 \end{cases}$$

$$\begin{cases} t_r = t_m + t_n \\ x_r = k_r\left(t_m + t_n\right) \\ x_r = \left(x_m + x_m\right) - \left(k_p t_m + k_q t_n\right) \\ k_p t_m + k_q t_n \neq 0 \\ x_r \neq x_m + x_n \end{cases}$$

Space is not closed under addition, space is not linear with time, Lorentz transformation doesn't work, it doesn't make any mathematical sense.

### Is Uniformly Accelerated Particle Motion a Linear Space?

Uniformly accelerated particle motion

$$\begin{cases} \cdots, t_m, \cdots, t_n, \cdots, t_r, \cdots \mid m, n, r \in \mathbf{N}, m < n < r \\ \cdots, x_m, \cdots, x_n, \cdots, x_r, \cdots \mid m, n, r \in \mathbf{N}, m < n < r \\ t_r = t_m + t_n \mid \forall t > 0 \\ x_m = f\left(t_m\right) = \dfrac{1}{2} a t_m^2 \mid \forall a > 0, x > 0 \\ x_n = f\left(t_n\right) = \dfrac{1}{2} a t_n^2 \mid \forall a > 0, t_m > 0, t_n > 0, t_r > 0 \\ x_r = f\left(t_r\right) = \dfrac{1}{2} a t_r^2 = \left(x_m + x_n\right) + a t_m t_n \\ x_r \neq x_m + x_n \mid \exists a t_m t_n > 0 \end{cases}$$

$$\begin{cases} t_r = t_m + t_n \\ x_m = f\left(t_m\right) = \dfrac{1}{2} a t_m^2 \\ x_n = f\left(t_n\right) = \dfrac{1}{2} a t_n^2 \\ x_r = f\left(t_r\right) = f\left(t_m + t_n\right) = \left(f\left(t_m\right) + f\left(t_n\right)\right) + a t_m t_n = \left(x_m + x_n\right) + a t_m t_n \\ f\left(t_m + t_n\right) = f\left(t_m\right) + f\left(t_n\right) + a t_m t_n \\ f\left(t_m + t_n\right) \neq f\left(t_m\right) + f\left(t_n\right) \\ x_r \neq x_m + x_n \end{cases}$$

Space is not closed under addition, space is not linear with time, Lorentz transformation doesn't work, it doesn't make any mathematical sense.

### In Theory, Is the Reading of a Clock the Same Concept as Time in Space?

Definition of time: a physical quantity that indicates the speed at which everything in the universe moves and changes in nature and form.

Unit of time: year, month, day, hour, minute, second.

Time measuring tools: sundials, hourglasses, clocks, mobile phones, etc.

By absolute, real, mathematical time, I probably mean the concept of time. The so-called relative, ostensible, ordinary time probably refers to the unit of time. The so-called clock time is just the reading of a now obsolete tool for testing time.

In scientific theory, the numerical value of a physical quantity does not normally take into account the error of the test tool. To consider whether two clocks are at the same time is therefore as absurd as to consider whether two rulers are the same length, or whether two sets of balances are the same weight, or whether two thermometers are the same temperature.

## The Definition of Simultaneity Is a False Proposition

Simultaneous definition:

$$\frac{1}{2}(t_A + t'_A) = t_B$$

In fact, it means: (1) Light takes the same time to travel the same distance. (2) Light travels the same way in the same time. (3) The light travels a different distance, and the ratio of the time needed is the same. (4) The ratio of light to time over a distance is equal to the speed of light.

And all adults agree that in a stationary inertial system, light takes the same amount of time to travel to and from two points. This question, if it is considered to be some profound theory, is the greatest insult to science.

Relativity says that in any inertial system, light rays traveling back and forth between two points, either at rest or in motion, take the same amount of time and are simultaneous points. If they don’t take the same amount of time, they’re not simultaneous points. What a ridiculous thing to do, because you want to prove that there are simultaneous points in space, but also that there are different simultaneous points in space. And we know that point time is the time of all the points in the entire universe.

Relativity says that in any inertial frame, a stationary inertial frame, or a moving inertial frame, light rays traveling back and forth between two points take the same amount of time and are simultaneous points; If they don’t take the same amount of time, they’re not simultaneous points. What a ludicrous thing to do, because Einstein wanted to prove that there are simultaneous points in space, but also that there are different simultaneous points in space. And we know that point time is the time of all the points in the entire universe. In space, there are no points at different times.

First of all, it’s an axiom of physics that all points in space are the same. Therefore, Einstein’s definition of simultaneity is a redundant theorem and a false proposition. Second, judging whether two points are at the same time simply by whether it takes the same amount of time for light to travel back and forth between them conflicts with Einstein’s definition. Because, in motion, light rays travel different distances to and from two points, and of course take different amounts of time; But they have the same ratio, the speed of light, so simultaneity is not broken.

## Does Movement Destroy Simultaneity?

The theory of relativity says: lightning strikes the head of the train and the tail of the train, on the track, the light to travel to the head of the train and the tail of the train, the time is the same, the two ends of the train car are the same; In a moving train, the time to reach the front of the train is slower, the time to return to the rear of the train is faster, and the simultaneity of the two ends of the train car is broken.

But is this really the case?

$$\begin{cases} t_{AB} = t_B - t_A = \dfrac{l_{AB}}{c} = \dfrac{l + t_{AB}v}{c} \Rightarrow t_{AB} = \dfrac{l}{c-v} \\ t_{BA} = t_{A'} - t_B = \dfrac{l_{BA}}{c} = \dfrac{l - t_{BA}v}{c} \Rightarrow t_{BA} = \dfrac{l}{c+v} \\ (l_{AB} = l + \dfrac{lv}{c-v}) \bigwedge \left(l_{BA} = l - \dfrac{lv}{c+v}\right) \Rightarrow l_{AB} + l_{BA} = 2l + \dfrac{2lv^2}{c^2-v^2} = \dfrac{2lc^2}{c^2-v^2} \\ t_{AB} + t_{BA} = \dfrac{2lc}{c^2-v^2} \\ \dfrac{l_{AB}+l_{BA}}{t_{AB}+t_{BA}} = c \\ (l_{AB} \neq l_{BA}) \wedge (l_{AB} > l_{BA}) \\ (l_{AB} + l_{BA} \neq 2l) \wedge (l_{AB} + l_{BA} > 2l) \\ (t_{AB} \neq t_{BA}) \wedge (t_{AB} > t_{BA}) \end{cases}$$

The speed at which light reaches the front of the train is:

$$\frac{l_{AB}}{t_{AB}} = \frac{l + \frac{lv}{c-v}}{\frac{l}{c-v}} = c$$

The speed of light returning to the tail of the train is:

$$\frac{l_{BA}}{t_{BA}} = \frac{l - \frac{lv}{c+v}}{\frac{l}{c+v}} = c$$

The speed of light traveling from the head to the tail of a train car is:

$$\frac{l_{AB}+l_{BA}}{t_{AB}+l_{BA}} = \frac{\frac{2lc^2}{c^2-v^2}}{\frac{2lc}{c^2-v^2}} = c$$

When light reaches the front of the car, the speed of light is moving in the same direction as the speed of the train, and the relative speed between them is:

$$\overrightarrow{c} - \overrightarrow{v}$$

$$(\overrightarrow{c} \| \overrightarrow{v}) \bigwedge (c \ggg v) \Rightarrow \left|\overrightarrow{c} - \overrightarrow{v}\right| = c - v$$

When light returns to the rear of the car, the direction of light is opposite to the direction of the train's speed, and the relative speed between them is:

$$\overrightarrow{c} - (-\overrightarrow{v}) = \overrightarrow{c} + \overrightarrow{v}$$

$$(\overrightarrow{c} \parallel \overrightarrow{v}) \bigwedge (c \ggg v) \Rightarrow \left|\overrightarrow{c} + \overrightarrow{v}\right| = c + v$$

That is to say, (*c*-*v*) and (*c*+*v*) are just relative speeds between light and the train; The speed of light in space, which is always *c*, has nothing to do with whether the inertial frame is stationary or moving. Light travels the same distance in the same amount of time. It takes the same amount of time to travel the same distance.

We recount these simplest and most basic physics and mathematics over and over again in order to emphasize that the "definition of simultaneity" is meaningless and that simultaneity is not broken in motion.

## How Did This Partial Differential Equation Come About?

$$\frac{1}{2}(\tau_0 + \tau_2) = \tau_1$$

$$\frac{1}{2}[\tau(0,0,0,t) + \tau\left(0,0,0,t + \frac{x'}{V-v} + \frac{x'}{V+v}\right)] = \tau\left(x',0,0,t + \frac{x'}{V-v}\right)$$

$$\frac{1}{2}\left(\frac{1}{V-v} + \frac{1}{V+v}\right)\frac{\partial\tau}{\partial t} = \frac{\partial\tau}{\partial x'} + \frac{1}{V-v}\frac{\partial\tau}{\partial t}$$

$$\frac{\partial\tau}{\partial x'} + \frac{v}{V^2 - v^2}\frac{\partial\tau}{\partial t} = 0$$

$$\tau = a\left(t - \frac{v}{V^2 - v^2}x'\right)$$

Einstein thought that $\tau$ is a function of $t$ and $x'$. And Einstein thought that space-time is linear, so $\tau$ is a linear function. We set $\tau$ to be a binary function of $t$ and $x'$. Since $\tau = 0$ and $x' = 0$ when $t = 0$, there is no constant term in this function expression.

$$\tau = \tau(t, x') = at + bx'$$

$$\frac{\partial\tau}{\partial t} = a, \frac{\partial\tau}{\partial x'} = b$$

Because there is no algebraic term in the function expression that contains $y$ and $z$.

$$\frac{\partial\tau}{\partial y}=0$$

$$\frac{\partial\tau}{\partial z}=0$$

$$\frac{\partial\tau}{\partial t}|_{t=t}=\frac{\partial\tau}{\partial t}|_{t=t+\frac{x'}{V-v}}=\frac{\partial\tau}{\partial t}|_{t=t+\frac{x'}{V-v}+\frac{x'}{V+v}}=a$$

$$\frac{\partial\tau}{\partial x'}|_{x'=0}=\frac{\partial\tau}{\partial x'}|_{x'=x'}=b$$

$$\frac{1}{2}(\pi_0+\tau_2)=\tau_1$$

$$\frac{1}{2}[\tau(0,0,0,t)+\tau\left(0,0,0,t+\frac{x'}{V-v}+\frac{x'}{V+v}\right)]=\tau\left(x',0,0,t+\frac{x'}{V-v}\right)$$

In the above formula, the partial derivatives of the $\tau$ function with respect to the different coordinates of $x'$, $y$, $z$, $t$, cancel out all except the partial derivatives of the compound variable.

$$\frac{1}{2}\left(\frac{\partial\tau}{\partial x'}|_{x'=0}+\frac{\partial\tau}{\partial x'}|_{x'=0}\right)=\frac{\partial\tau}{\partial x'}|_{x'=x'}$$

$$\frac{1}{2}\left(\frac{\partial\tau}{\partial y}|_{y=0}+\frac{\partial\tau}{\partial y}|_{y=0}\right)=\frac{\partial\tau}{\partial y}|_{y=0}$$

$$\frac{1}{2}\left(\frac{\partial\tau}{\partial z}|_{z=0}+\frac{\partial\tau}{\partial z}|_{z=0}\right)=\frac{\partial\tau}{\partial z}|_{z=0}$$

$$\frac{1}{2}\left(\frac{\partial\tau}{\partial t}|_{t=t}+\frac{\partial\tau}{\partial\left(t+\frac{x'}{V-v}+\frac{x'}{V+v}\right)}\cdot\frac{\partial\left(t+\frac{x'}{V-v}+\frac{x'}{V+v}\right)}{\partial t}+\frac{\partial\tau}{\partial\left(t+\frac{x'}{V-v}+\frac{x'}{V+v}\right)}\cdot\frac{\partial\left(t+\frac{x'}{V-v}+\frac{x'}{V+v}\right)}{\partial x'}\right)$$

$$=\frac{\partial\tau}{\partial\left(t+\frac{x'}{V-v}\right)}\cdot\frac{\partial\left(t+\frac{x'}{V-v}\right)}{\partial t}+\frac{\partial\tau}{\partial\left(t+\frac{x'}{V-v}\right)}\cdot\frac{\partial\left(t+\frac{x'}{V-v}\right)}{\partial x'}$$

$$\frac{1}{2}\left(\frac{\partial\tau}{\partial t}\Big|_{t=t}+\frac{\partial\tau}{\partial\left(t+\frac{x'}{V-v}+\frac{x'}{V+v}\right)}\cdot\frac{\partial\left(t+\frac{x'}{V-v}+\frac{x'}{V+v}\right)}{\partial t}\right)=\frac{\partial\tau}{\partial\left(t+\frac{x'}{V-v}\right)}\cdot\frac{\partial\left(t+\frac{x'}{V-v}\right)}{\partial t}$$

$$\frac{1}{2}\cdot\frac{\partial\tau}{\partial\left(t+\frac{x'}{V-v}+\frac{x'}{V+v}\right)}\cdot\frac{\partial\left(t+\frac{x'}{V-v}+\frac{x'}{V+v}\right)}{\partial x'}=\frac{\partial\tau}{\partial\left(t+\frac{x'}{V-v}\right)}\cdot\frac{\partial\left(t+\frac{x'}{V-v}\right)}{\partial x'}$$

$$\Rightarrow\begin{cases}\frac{1}{2}\left(\frac{1}{V-v}+\frac{1}{V+v}\right)=\frac{1}{V-v}\Rightarrow\frac{v}{V^2-v^2}=0\Rightarrow v=0 & (contradiction, no\ sence)\\ \frac{1}{2}\cdot\frac{\partial\tau}{\partial x'}=\frac{\partial\tau}{\partial x'}\Rightarrow\frac{\partial\tau}{\partial x'}=0\Rightarrow\frac{\partial\tau}{\partial x'}=b=0\Rightarrow\tau=at\Rightarrow & (contradiction, no\ sence)\\ \Rightarrow\frac{1}{2}(\tau_0+\tau_2)=\tau_1\Rightarrow\frac{1}{2}(at_0+at_2)=at_1\Rightarrow\frac{1}{2}(t_0+t_2)=t_1 & (motion\ does\ not\ destroy\ the\ simultaneity\ of\ time)\end{cases}$$

The conclusion is that the implicated velocity $v = 0$, the partial derivative of $\tau$ with respect to $x'$ does not exist, $\tau$ is not a function of $x'$, $\tau$ is only a function of $t$. And it doesn't destroy the simultaneity of time. In short, Einstein's differential equations were wrong, and the corresponding relationships were simply cobbled together. That is to say, Einstein's relation for the simultaneity of space-time coordinates in the dynamic system is also a false proposition. So Einstein couldn't get to:

$$\frac{\partial\tau}{\partial x'}+\frac{v}{V^2-v^2}\frac{\partial\tau}{\partial t}=0$$

this partial differential equation at all.

## How Was the Solution to This Partial Differential Equation Obtained?

So how did Einstein get to

$$\tau=a\left(t-\frac{v}{V^2-v^2}x'\right)$$

this relationship, the solution to the partial differential equation?

$$\tau=\tau(t,x')=at+bx'=\frac{\partial\tau}{\partial t}\cdot t+\frac{\partial\tau}{\partial x'}\cdot x'=a\left(t-\left(-\frac{b}{a}\right)x'\right)$$

$$\frac{\partial\tau}{\partial x'}+\frac{v}{V^2-v^2}\cdot\frac{\partial\tau}{\partial t}=0\Rightarrow b+\frac{v}{V^2-v^2}\cdot a=0\Rightarrow-\frac{b}{a}=\frac{v}{V^2-v^2}$$

$$\Rightarrow\tau=a\left(t-\frac{v}{V^2-v^2}x'\right)$$

So Einstein, from his partial differential equation, couldn't get the solution to the partial differential equation that we see.

## Conclusion

The journey to explore science is arduous and tortuous. Mistakes or achievements, in the long history of science, are a kind of progress, and are on the basis of the hard work of predecessors. The discovery of a theory has some mistakes, for the perfection of this theory, for the development of this theory, is a great promotion. Because our knowledge is very limited, mistakes and inappropriate places are inevitable, welcome everyone to criticize and correct.

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