Internal Paradox of Special Relativity Theory and its Resolution

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Abstract

Regarding to special relativity theory, there are some paradoxes. Almost these are derived from the theory. Then these should be resolved with the accurate deduction if possible. On the other hand, there may also be a paradox inside the theory. To solve it, more basic definition should be required.

1. Introduction

Lorentz transformation has been derived on the principle of light speed constancy, and some paradoxes were derived based on the result of the transformation. [1][2]
Also the principle of light speed constancy itself may have paradox. Resolution for it should require more basic principle.

2. Paradox of light speed constancy

When light flushes at point A in Fig.1, the light reaches at point ct_1 away after t_1.
c: light speed

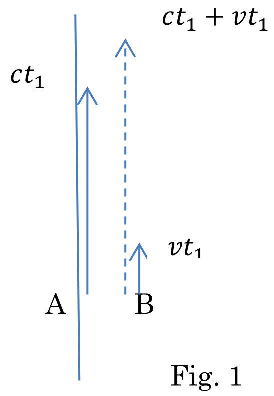

Fig. 1

Point B which moves from A with speed v reaches at point vt_1 away after t_1. On the principle of light speed constancy, for the frame of reference of point B, light should reach at $ct_1 + vt_1$ away from point A.
On above,
For A, light reaches at point ct_1 away from point A after t_1.
For B, light reaches at point $ct_1 + vt_1$ away from point A after t_1.
This means that light flushed at a point reaches at different points to same direction and for same time. This is a paradox about the principle of light speed constancy.

3. Resolution of the paradox

Following definition is introduced. [3]

'CT (Clock Time) moves in space with speed c.' (1)

This is equivalent to following

'Elapse time is $\frac{x}{c}$ for CT to move space distance x.'

Same as in Fig.1, when light flushes at point A in Fig.2, the light reaches at point C(ct_1 away) after t_1.

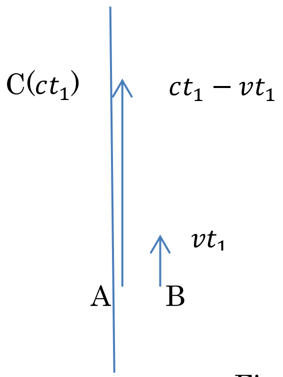

Fig. 2

Same as light, CT reaches at point C and time $\frac{ct_1}{c} = t_1$ elapses.

Also point B reaches at point vt_1. Then for the frame of reference of point B, light moves $ct_1 - vt_1$ in space.

Same as this, CT also moves $ct_1 - vt_1$ in space. This means time $\frac{(c-v)}{c}t_1$ elapsed.

It is,

For the frame of reference of point A, moved distance of light is ct_1.

For the frame of reference of point A, elapsed time is t_1.

For the frame of reference of point B, moved distance of light is $(c-v)t_1$.

For the frame of reference of point B, moved distance of CT is $(c-v)t_1$.

For the frame of reference of point B, elapsed time is $\frac{(c-v)}{c}t_1$.

Here Lorentz transformation which considers scaling and the frame of reference for oblique is applied to these. [4]

For the frame of reference of point A, moved distance of light is ct_1.

For the frame of reference of point A, elapsed time is t_1.

For the frame of reference of point B, moved distance of light is $\frac{(c-v)}{\sqrt{1-\frac{v^2}{c^2}}}t_1$.

For the frame of reference of point B, moved distance of CT is $\frac{(c-v)}{\sqrt{1-\frac{v^2}{c^2}}}t_1$.

For the frame of reference of point B, elapsed time is $\frac{(c-v)}{c\sqrt{1-\frac{v^2}{c^2}}}t_1$.

When time passes more up to $\frac{\sqrt{c+v}}{\sqrt{c-v}}t_1$, light and CT reach point D and situation becomes as Fig.3.

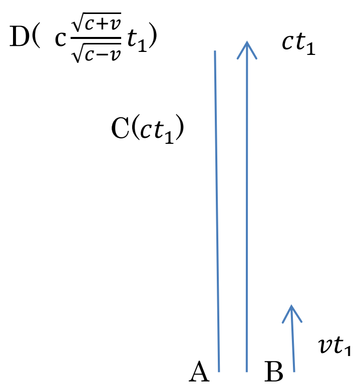

Fig. 3

Scaling and the frame of reference for oblique applied value is;

For the frame of reference of point A, moved distance of light is $\frac{c+v}{\sqrt{1-\frac{v^2}{c^2}}}t_1$.

For the frame of reference of point A, elapsed time is $\frac{c+v}{c\sqrt{1-\frac{v^2}{c^2}}}t_1$.

For the frame of reference of point B, moved distance of light is ct_1.

For the frame of reference of point B, moved distance of CT is ct_1.

For the frame of reference of point B, elapsed time is t_1.

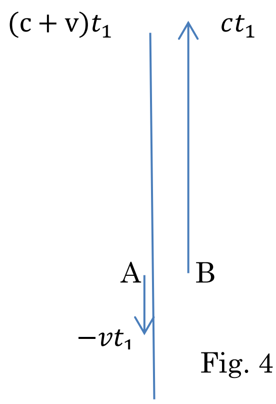

Fig. 4

Similar situation can be realized from the view of frame of reference of B (Fig.4), this is;

Light flushes at point B reaches at point D(ct_1), also A reaches at $-vt_1$.

For the frame of reference of point A, moved distance of light is $(\mathrm{c}+v)t_1$.

For the frame of reference of point A, elapsed time is $\frac{(\mathrm{c}+v)}{c}t_1$.

For the frame of reference of point B, moved distance of light is ct_1.

For the frame of reference of point B, moved distance of CT is ct_1.

For the frame of reference of point B, elapsed time is t_1.

Scaling and the frame of reference for oblique applied value is;

For the frame of reference of point A, moved distance of light is $\frac{(c+v)}{\sqrt{1-\frac{v^2}{c^2}}}t_1$.

For the frame of reference of point A, elapsed time is $\frac{(c+v)}{c\sqrt{1-\frac{v^2}{c^2}}}t_1$.

For the frame of reference of point B, moved distance of light is ct_1.

For the frame of reference of point B, moved distance of CT is ct_1.

For the frame of reference of point B, elapsed time is t_1.

From all above,

If we accept the definition (1), light speed as ratio of moved distance and elapsed time is same for the frame of reference of point A and the frame of reference of point B in Fig.2, Fig.3 and Fig.4.

Also from Fig.2, Fig.3 and Fig.4, the situation is described similarly even if point A is fixed or point B is fixed.

4. Conclusion

The principle of light speed constancy has contradiction comparing daily experience. Then the special relativity theory on the principle of light speed constancy has contradiction in it. This contradiction is resolved using definition (1). The principle of light speed constancy is not definition. It is derived from the definition (1).

Reference

[1] Tsuneaki Takahashi, viXra:1604.0285,(http://vixra.org/abs/1604.0285)

[2] Tsuneaki Takahashi, viXra:1604.0328,(http://vixra.org/abs/1604.0328)

[3] Tsuneaki Takahashi, viXra:1611.0077,(http://vixra.org/abs/1611.0077)

[4] Tsuneaki Takahashi, viXra:1605.0039,(http://vixra.org/abs/1605.0039)