**A particular property of the Lorentz's equations**

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Abstract – In Lorentz equations the variables x and t are not space and time but wavelength and period of a wave, because the invariance value, that in relativity theory is a variable, is a constant in all universe.

From the Lorentz's equations:

$$\begin{cases} x = \dfrac{x_0 + vt_0}{\sqrt{1 - v^2/c^2}} \\ t = \dfrac{t_0 + vx_0/c^2}{\sqrt{1 - v^2/c^2}} \end{cases} \Leftrightarrow$$

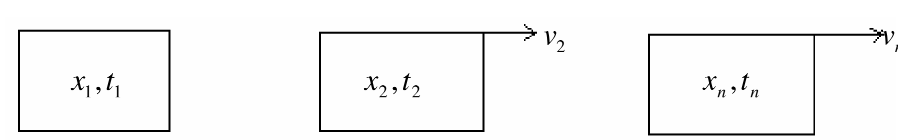
$$\Leftrightarrow \quad \begin{cases} v^2(c^2 t_0{}^2 + x^2) + 2c^2 v x_0 t_0 + c^2(x_0{}^2 - x^2) = 0 \\ v^2(x_0{}^2 + c^2 t^2) + 2c^2 v x_0 t_0 + c^4(t_0{}^2 - t^2) = 0 \end{cases}$$

Equaling the coefficients:

$$\frac{2c^2 x_0 t_0}{c^2 t_0{}^2 - x^2} = \frac{2c^2 x_0 t_0}{x_0{}^2 + c^2 t^2} \quad \Leftrightarrow \quad c^2 t^2 - x^2 = c^2 t_0{}^2 - x_0{}^2$$

$$\frac{c^2(x_0{}^2 - x^2)}{c^2 t_0{}^2 + x^2} = \frac{c^4(t_0{}^2 - t^2)}{x_0{}^2 + c^2 t^2} \quad \Leftrightarrow \quad c^2 t^2 - x^2 = c^2 t_0{}^2 - x_0{}^2$$

For $n$ relative frames with $v_n$ relative speeds:




$$\begin{cases} x_2 = \dfrac{x_1 + v_2 t_1}{\sqrt{1 - v_2{}^2/c^2}} \\ t_2 = \dfrac{t_1 + v_2 x_1/c^2}{\sqrt{1 - v_2{}^2/c^2}} \end{cases} \quad \Leftrightarrow \quad c^2 t_2{}^2 - x_2{}^2 = c^2 t_1{}^2 - x_1{}^2$$

$$\begin{cases} x_n = \dfrac{x_1 + v_n t_1}{\sqrt{1 - v_n{}^2 / c^2}} \\ t_n = \dfrac{t_1 + v_n x_1 / c^2}{\sqrt{1 - v_n{}^2 / c^2}} \end{cases} \Leftrightarrow \qquad c^2 t_n{}^2 - x_n{}^2 = c^2 t_1{}^2 - x_1{}^2$$

$$v_x = c^2 \frac{v_n - v_2}{c^2 - v_n v_2}$$

$$\begin{cases} x_n = \dfrac{x_2 + v_x t_2}{\sqrt{1 - v_x{}^2 / c^2}} \\ t_n = \dfrac{t_2 + v_x x_2 / c^2}{\sqrt{1 - v_x{}^2 / c^2}} \end{cases} \Leftrightarrow \qquad c^2 t_n{}^2 - x_n{}^2 = c^2 t_2{}^2 - x_2{}^2$$

So:

$$c^2 t_1{}^2 - x_1{}^2 = c^2 t_2{}^2 - x_2{}^2 = \cdots = c^2 t_n{}^2 - x_n{}^2 \qquad \Leftrightarrow$$

$$c^2 t_n{}^2 - x_n{}^2 = k \quad \text{(Constant)}$$

In any case x and t are not independent coordinates. x and t must be wavelength and period.

In relativity theory this value k is a variable (it can be = 0 , >0 or <0) but as we have demonstrated it is a constant.

The value of k is equal to:

$$k = 4 \times 10^{-34} m^2$$

A direct consequence is that: the vacuum light speed is variable with the frequency and the space-time doesn't exist.