Armenian Theory of Special Relativity ©

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ABSTRACT

By using the principle of relativity (first postulate), together with new defined nature of the universal speed (our second postulate) and homogeneity of time-space (our third postulate), we derive the most general transformation equations of relativity in one dimensional space. According to our new second postulate, the universal (not limited) speed c in Armenian Theory of Special Relativity is not the actual speed of light but it is the speed of time which is the same in all inertial systems. Our third postulate: the homogeneity of time-space is necessary to furnish linear transformation equations. We also state that there is no need to postulate the isotropy of time-space. Our article is the accumulation of all efforts from physicists to fix the Lorentz transformation equations and build correct and more general transformation equations of relativity which obey the rules of logic and fundamental group laws without internal philosophical and physical inconsistencies.

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INTRODUCTION

On the basis of the previous works of different authors,[2,3,4,5] a sense of hope was developed that it is possible to build a general theory of Special Relativity without using light phenomena and its velocity as an invariant limited speed of nature. The authors also explore the possibility to discard the postulate of isotropy time-space.[1,4]

In the last five decades, physicists gave special attention and made numerous attempts to construct a theory of Special Relativity from more general considerations, using abstract and pure mathematical approaches rather than relying on so called experimental facts.[6]

After many years of research we came to the conclusion that previous authors did not get satisfactory solutions and they failed to build the most general transformation equations of Special Relativity even in one dimensional space, because they did not properly define the universal invariant velocity and did not fully deploy the properties of anisotropic time-space.

However, it is our pleasure to inform the scientific community that we have succeeded to build a mathematically solid theory which is an unambiguous generalization of Special Relativity in one dimensional space.

The principle of relativity is the core of the theory relativity and it requires that the inverse time-space transformations between two inertial systems assume the same functional forms as the original (direct) transformations. The principle of homogeneity of time-space is also necessary to furnish linear time-space transformations respect to time and space.[2,3,5]

There is also no need to use the principle of isotropy time-space, which is the key to our success.

To build the most general theory of Special Relativity in one physical dimension, we use the following three postulates:

1. All physical laws have the same mathematical functional forms in all inertial systems.
2. There exists a universal, not limited and invariant boundary speed c, which is the speed of time. (1)
3. In all inertial systems time and space are homogeneous (Special Relativity).

Besides the postulates (1), for simplicity purposes we also need to use the following initial conditions as well:

$$\begin{cases} \text{When} \quad t = t' = t'' = \ldots = 0 \\ \text{Then origins of all inertial systems coincide each other, therefore} \quad x_0 = x_0' = x_0'' = \ldots = 0 \end{cases} \tag{2}$$

Because of the first and third postulates (1), time and space transformations between two inertial systems are linear:

Direct transformations and Inverse transformations

$$\begin{cases} t' = \beta_1(v)t + \beta_2(v)x \\ x' = \gamma_1(v)x + \gamma_2(v)t \end{cases} \quad \text{and} \quad \begin{cases} t = \beta_1(v')t' + \beta_2(v')x' \\ x = \gamma_1(v')x' + \gamma_2(v')t' \end{cases} \tag{3}$$

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ARMENIAN RELATIVISTIC KINEMATICS

Using our postulates (1) with the initial conditions (2) and implementing them into the general form of transformation equations (3), we finally get the most general transformation equations in one physical dimension, which we call - **Armenian transformation equations**. Armenian transformation equations, contrary to the Lorentz transformation equations, has two new constants (s and g) which characterize anisotropy and homogeneity of time-space. Lorentz transformation equations and all other formulas can be obtained from the Armenian Theory of Special Relativity by substituting $s = 0$ and $g = -1$.

Direct transformations and Inverse transformations

$$\begin{cases} t' = \gamma_{չ}(v)\left[(1 + s\frac{v}{c})t + g\frac{v}{c^2}x\right] \\ x' = \gamma_{չ}(v)(x - vt) \end{cases} \quad \text{and} \quad \begin{cases} t = \gamma_{չ}(v')\left[\left(1 + s\frac{v'}{c}\right)t' + g\frac{v'}{c^2}x'\right] \\ x = \gamma_{չ}(v')(x' - v't') \end{cases} \qquad (4)$$

Relations between reciprocal and direct relative velocities are:

$$\begin{cases} v' = -\dfrac{v}{1 + s\frac{v}{c}} \\ v = -\dfrac{v'}{1 + s\frac{v'}{c}} \end{cases} \quad \Rightarrow \quad (1 + s\frac{v}{c})\left(1 + s\frac{v'}{c}\right) = 1 \qquad (5)$$

Armenian gamma functions for direct and reciprocal relative velocities, with Armenian subscript letter $չ$, are:

$$\begin{cases} \gamma_{չ}(v) = \dfrac{1}{\sqrt{1 + s\frac{v}{c} + g\frac{v^2}{c^2}}} > 0 \\ \gamma_{չ}(v') = \dfrac{1}{\sqrt{1 + s\frac{v'}{c} + g\frac{v'^2}{c^2}}} > 0 \end{cases} \quad \Rightarrow \quad \gamma_{չ}(v)\gamma_{չ}(v') = \frac{1}{1 - g\frac{vv'}{c^2}} > 0 \qquad (6)$$

Relations between reciprocal and direct Armenian gamma functions are:

$$\begin{cases} \gamma_{չ}(v') = \gamma_{չ}(v)(1 + s\frac{v}{c}) > 0 \\ \gamma_{չ}(v) = \gamma_{չ}(v')\left(1 + s\frac{v'}{c}\right) > 0 \end{cases} \quad \text{also} \quad \gamma_{չ}(v')v' = -\gamma_{չ}(v)v \qquad (7)$$

Armenian invariant interval (we are using Armenian letter $ե$) has the following expression:

$$ե^2 = (ct')^2 + s(ct')x' + gx'^2 = (ct)^2 + s(ct)x + gx^2 > 0 \qquad (8)$$

Armenian formulas of time, length and mass changes in K and K' inertial systems are:

$$\begin{cases} t = \gamma_{չ}(v)t_0 = \dfrac{t_0}{\sqrt{1 + s\frac{v}{c} + g\frac{v^2}{c^2}}} \\ l = \dfrac{l_0}{\gamma_{չ}(v)} = l_0\sqrt{1 + s\frac{v}{c} + g\frac{v^2}{c^2}} \\ m = \gamma_{չ}(v)m_0 = \dfrac{m_0}{\sqrt{1 + s\frac{v}{c} + g\frac{v^2}{c^2}}} \end{cases} \quad \text{and} \quad \begin{cases} t' = \gamma_{չ}(v')t_0 = \dfrac{t_0}{\sqrt{1 + s\frac{v'}{c} + g\frac{v'^2}{c^2}}} \\ l' = \dfrac{l_0}{\gamma_{չ}(v')} = l_0\sqrt{1 + s\frac{v'}{c} + g\frac{v'^2}{c^2}} \\ m' = \gamma_{չ}(v')m_0 = \dfrac{m_0}{\sqrt{1 + s\frac{v'}{c} + g\frac{v'^2}{c^2}}} \end{cases} \qquad (9)$$

Transformations formulas for velocities (addition and subtraction) and Armenian gamma functions are.

$$\begin{cases} u = u' \oplus v = \dfrac{u' + v + s\frac{vu'}{c}}{1 - g\frac{vu'}{c^2}} \\ \gamma_{չ}(u) = \gamma_{չ}(v)\gamma_{չ}(u')\left(1 - g\frac{vu'}{c^2}\right) \end{cases} \quad \text{and} \quad \begin{cases} u' = u \ominus v = \dfrac{u - v}{1 + s\frac{v}{c} + g\frac{vu}{c^2}} \\ \gamma_{չ}(u') = \gamma_{չ}(v)\gamma_{չ}(u)\left(1 + s\frac{v}{c} + g\frac{vu}{c^2}\right) \end{cases} \qquad (10)$$

If we in the K inertial system use the following notations for mirror reflection of time and space coordinates:

$$\begin{cases} \bar{t} & \text{–} \quad \text{mirror reflection of time } t \\ \bar{x} & \text{–} \quad \text{mirror reflection of space } x \end{cases} \tag{11}$$

Then the Armenian relation between reflected $(\bar{t},\bar{x})$ and normal (t,x) time-space coordinates of the same event are:

$$\begin{cases} \bar{t} = t + \frac{1}{c}sx \\ \bar{x} = -x \end{cases} \quad \text{and} \quad \begin{cases} t = \bar{t} + \frac{1}{c}s\,\bar{x} \\ x = -\bar{x} \end{cases} \tag{12}$$

The ranges of velocity w for the free moving particle, depending on the domains of time-space constants s and g, are

$g \setminus s$	$s < 0$	$s = 0$	$s > 0$
$g < 0$	$0 < w < w_0$	$0 < w < c\sqrt{-\frac{1}{g}}$	$0 < w < w_0$
$g \geqslant 0$	$0 < w < -\frac{1}{s}c$	$0 < w < \infty$	$0 < w < \infty$

(13)

Where w_0 is the fixed velocity value for $g < 0$, which equals to: $$w_0 = -\frac{1}{g}\left(\frac{1}{2}s + \sqrt{(\frac{1}{2}s)^2 - g}\right)c > 0 \tag{14}$$

Table (13) shows that there exists four different and distinguished range of velocities w for free moving particle, which are produced by different domains of time-space constants s and g as shown in the table below:

$g < 0, \quad s = 0$	$g < 0, \quad s < 0, \quad s > 0$	$g \geqslant 0, \quad s < 0$	$g \geqslant 0, \quad s \geqslant 0$
$0 < w < c\sqrt{-\frac{1}{g}}$	$0 < w < w_0$	$0 < w < -\frac{1}{s}c$	$0 < w < \infty$

(15)

Table (15) shows us that each distinct domains of (s, g) time-space constants corresponds to its own unique range of velocities, so therefore we can suggest that each one of them represents one of the four fundamental forces of nature with different flavours (depending on domains of s).

ARMENIAN RELATIVISTIC DYNAMICS

Armenian formulas for acceleration transformations between K' and K inertial systems are:

$$\begin{cases} a' = \dfrac{1}{\gamma_{\text{չ}}^3(v)\left(1 + s\frac{v}{c} + g\frac{vu}{c^2}\right)^3}a \\[2ex] a = \dfrac{1}{\gamma_{\text{չ}}^3(v)\left(1 - g\frac{vu'}{c^2}\right)^3}a' \end{cases} \tag{16}$$

Armenian acceleration formula, which is invariant for given movement, we define as:

$$a_{\text{չ}} = \gamma_{\text{չ}}^3(u)a = \gamma_{\text{չ}}^3(u')a' \tag{17}$$

Armenian relativistic Lagrangian function for free moving particle with velocity w is:

$$\mathcal{L}_{\text{չ}}(w) = -\,m_0c^2\sqrt{1 + s\frac{w}{c} + g\frac{w^2}{c^2}} \tag{18}$$

Armenian relativistic energy and momentum formulas for free moving particle with velocity w are:

$$\begin{cases} E_{\text{չ}}(w) = \gamma_{\text{չ}}(w)(1 + \frac{1}{2}s\frac{w}{c})m_0c^2 = \dfrac{1 + \frac{1}{2}s\frac{w}{c}}{\sqrt{1 + s\frac{w}{c} + g\frac{w^2}{c^2}}}m_0c^2 \\[3ex] p_{\text{չ}}(w) = -\,\gamma_{\text{չ}}(w)(g\frac{w}{c} + \frac{1}{2}s)m_0c = -\,\dfrac{g\frac{w}{c} + \frac{1}{2}s}{\sqrt{1 + s\frac{w}{c} + g\frac{w^2}{c^2}}}m_0c \end{cases} \tag{19}$$

First approximation of the Armenian relativistic energy and momentum formulas (19) are:

$$\begin{cases} E_{\text{չ}}(w) \approx m_0c^2 - (g - \frac{1}{4}s^2)(\frac{1}{2}m_0w^2) = m_0c^2 + \frac{1}{2}m_{\text{չ}0}w^2 \\ p_{\text{չ}}(w) \approx -\frac{1}{2}sm_0c - (g - \frac{1}{4}s^2)(m_0w) = -\frac{1}{2}sm_0c + m_{\text{չ}0}w \end{cases} \tag{20}$$

Where we denote $m_{\text{չ}0}$ as the Armenian rest mass, which equals to:

$$m_{\text{չ}0} = -(g - \tfrac{1}{4}s^2)m_0 \gtrless 0 \tag{21}$$

Armenian momentum formula for rest particle $(w = 0)$, which is a very new and bizarre result, is:

$$\boxed{p_{\text{չ}}(0) = -\tfrac{1}{2}sm_0c} \tag{22}$$

From (22) we obtain Armenian dark energy and dark mass formulas, with Armenian subscript letter խ, and they are:

$$\boxed{E_{\text{խ}} = \frac{p_{\text{չ}0}^2}{2m_0} = \tfrac{1}{8}s^2m_0c^2 = \tfrac{1}{8}s^2E_0 \qquad \text{and} \qquad m_{\text{խ}} = \tfrac{1}{8}s^2m_0} \tag{23}$$

Armenian energy and momentum transformation equations $(g \neq 0)$ are:

Direct transformations

$$\begin{cases} g\dfrac{E'_{\text{չ}}}{c} = \gamma_{\text{չ}}(v)\left[\left(g\dfrac{E_{\text{չ}}}{c}\right) - g\frac{v}{c}p_{\text{չ}}\right] \\ p'_{\text{չ}} = \gamma_{\text{չ}}(v)\left[(1 + s\frac{v}{c})p_{\text{չ}} + \frac{v}{c}\left(g\dfrac{E_{\text{չ}}}{c}\right)\right] \end{cases}$$

and

Inverse transformations

$$\begin{cases} g\dfrac{E_{\text{չ}}}{c} = \gamma_{\text{չ}}(v)\left[(1 + s\frac{v}{c})\left(g\dfrac{E'_{\text{չ}}}{c}\right) + g\frac{v}{c}p'_{\text{չ}}\right] \\ p_{\text{չ}} = \gamma_{\text{չ}}(v)\left[p'_{\text{չ}} - \frac{v}{c}\left(g\dfrac{E'_{\text{չ}}}{c}\right)\right] \end{cases} \tag{24}$$

From (24) we get the following invariant Armenian relation $(g \neq 0)$:

$$\left(g\frac{E_{\text{չ}}}{c}\right)^2 + s\left(g\frac{E_{\text{չ}}}{c}\right)p_{\text{չ}} + g\left(p_{\text{չ}}\right)^2 = \left(g\frac{E'_{\text{չ}}}{c}\right)^2 + s\left(g\frac{E'_{\text{չ}}}{c}\right)p'_{\text{չ}} + g\left(p'_{\text{չ}}\right)^2 = g(g - \tfrac{1}{4}s^2)(m_0c)^2 \tag{25}$$

Armenian force components in K and K' inertial systems are (see full article):

$$\begin{cases} F^0_{\text{չ}} = \dfrac{d}{dt}\left(\frac{g}{c}E_{\text{չ}}\right) = g\frac{u}{c}F_{\text{չ}} \\ F_{\text{չ}} = \dfrac{d}{dt}\left(p_{\text{չ}}\right) = m_{\text{չ}0}a_{\text{չ}} \end{cases} \qquad \text{and} \qquad \begin{cases} F'^0_{\text{չ}} = \dfrac{d}{dt'}\left(\frac{g}{c}E'_{\text{չ}}\right) = g\frac{u'}{c}F_{\text{չ}} \\ F'_{\text{չ}} = \dfrac{d}{dt}\left(p'_{\text{չ}}\right) = m_{\text{չ}0}a_{\text{չ}} \end{cases} \tag{26}$$

From (26) it follows that Armenian force space components are also invariant:

$$F_{\text{չ}} = F'_{\text{չ}} = m_{\text{չ}0}a_{\text{չ}} \tag{27}$$

As you can see (15)*, we are a few steps away to construct a unified field theory, which can change the face of modern physics as we know it now. But the final stage of the construction will come after we finish the Armenian Theory of Special Relativity in three dimensions.*

You can get our full article with all derivations, proofs and other amazing formulas (in Armenian language) via E-mail.

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