Change constant of gravity when mass is the fifth dimension

Author: MOHAMED AHMED ABOUZEID

STEM LUXOR-EGYPT

https://orcid.org/0000-0002-5836-7871

mohamed.abouzeid@stemluxor.moe.edu.eg

0201014419135

ABSTRACT

Assume mass is the fifth dimension in Special Relativity and Redefinition of the point as a circle. According to Einstein's first hypothesis only ،it can be reached to transfer formats between reference frames in the special theory of relativity and transformation of gravity constant between them.

Keywords

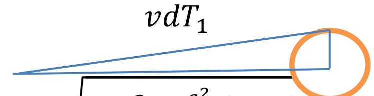
Special Relativity, fifth dimension, mass is the fifth dimension, Change constant gravity

Introduction

Redefinition of the point

Redefinition of the point as a circle the length of it the radius Equal the length of the Planck cdT_{pl}

SO $$dX_1 = vdT_1\sqrt{1 - \frac{v^2}{C^2}(1 - (\frac{dX_{PL}^2}{dX_1{}^2})}$$



$$dX_1 = v\sqrt{dT_1{}^2 - \frac{c^2}{v^2}\left(dT_{pl}^2\right)}$$

$$dX_1 = vdT_1\sqrt{1 - \frac{c^2}{v^2}\left(\frac{dT_{PL}^2}{dT_1{}^2}\right)}$$

$$dX_1 = vdT_1\sqrt{1 - \frac{v^2}{C^2}(1 - (\frac{dX_{PL}^2}{dX_1{}^2})}$$

contribution

Consider two observers A , B in both frames S_1 *,* S_2

At first $dT_1 = dT_2 = 0$

T_1 *The time at frame* S_1 *and* T_2 *the time at frame* S_2

Let A and B in the same place and at the same time, they each send a light signal

Let S_2 and (observer B) moving respect to S_1 and (observer A) with uniform Velocity $\vec{V}$

At the direction of the axis $\overrightarrow{ox}$

In this case the signal is spread as a spherical wave

Measurements A:

At moment dT_1 of his watch, the wave equation appears in the Formula:

$$dX_1{}^2 + dY_1{}^2 + dZ_1{}^2 - C_1{}^2 dT_1{}^2 - \frac{G_1{}^2}{C_1{}^4} dM_1{}^2 = 0 \quad \text{--------------------------------- (1)}$$

C_1 *Speed of light at frame* S_1

Measurements B:

At moment T_2 of his watch, the wave equation appears in the Formula:

$$dX_2{}^2 + dY_2{}^2 + dZ_2{}^2 - C_2{}^2 dT_2{}^2 - \frac{G_2{}^2}{C_2{}^4} dM_2{}^2 = 0 \quad \text{--------------------------------- (2)}$$

C_2 *Speed of light at frame* S_2

Notice $C_1 \neq C_2$

Then

$$dX_1{}^2 + dY_1{}^2 + dZ_1{}^2 - C_1{}^2 dT_1{}^2 - \frac{G_1{}^2}{C_1{}^4} dM_1{}^2 = dX_2{}^2 + dY_2{}^2 + dZ_2{}^2 - C_2{}^2 dT_2{}^2 - \frac{G_2{}^2}{C_2{}^4} dM_2{}^2 \quad \text{--------------------------------- (3)}$$

Let $dY_1 = dY_2$ *and* $dZ_1 = dZ_2$ *So*

$$\boldsymbol{dX_1{}^2 - C_1{}^2 dT_1{}^2 - \frac{G_1{}^2}{C_1{}^4} dM_1{}^2 = dX_2{}^2 - C_2{}^2 dT_2{}^2 - \frac{G_2{}^2}{C_2{}^4} dM_2{}^2} \quad \text{--------------------------------- } \mathbf{(4)}$$

Let

$$dX_2 = G_{11}\, dX_1 + G_{14}\, dT_1 + G_{15}\, dM_1 \quad \text{--------------------------------- (5)}$$

$$dT_2 = G_{41}\, dX_1 + G_{44}\, dT_1 + G_{45}\, dM_1 \quad \text{--------------------------------- (6)}$$

$$dM_2 = G_{51}\, dX_1 + G_{54}\, dT_1 + G_{55}\, dM_1 \quad \text{--------------------------------- (7)}$$

Where G_{11} , G_{14}, G_{41}, $G_{44} G_{51}$, $G_{54.}$, G_{55} *are constants*

Consider the moving of origin point O_2 *respect to* S_1

(Ordinates O_2 *) is* dX_2*=0*

So from equation (5) $dX_2 = G_{11}\, dX_1 + G_{14}\, dT_1 + G_{15}\, dM_1$

$0 = G_{11}\, dX_1 + G_{14}\, dT_1 + G_{15}\, dM_1$

$G_{14}\, dT_1 = -G_{11}\, dX_1 - G_{15}\, dM_1$

$G_{14} = -G_{11}\frac{dX_1}{dT_1} - G_{15}\frac{dM_1}{dT_1}$- *And* $\frac{dX_1}{dT_1} = v\sqrt{1 - \frac{\boldsymbol{C_1}^2}{v^2}\left(\frac{dT_{PL}^2}{dT_1{}^2}\right)}$

So $G_{14} = -G_{11}\, v\sqrt{1 - \frac{\boldsymbol{C_1}^2}{v^2}\left(\frac{dT_{PL}^2}{dT_1{}^2}\right)} - G_{15}\frac{dM_1}{dT_1}$ -------------------------------- *(8)*

Consider the moving of origin point O_1 *respect to* S_2

(Ordinates O_1 *) is* dX_1*=0*

So from equation (5)

$dX_2 = G_{11}\, dX_1 + G_{14}\, dT_1 + G_{15}\, dM_1$-------------------------------- *(5)*

$dX_2 = 0 + G_{14}\, dT_1 + G_{15}\, dM_1$

$dX_2 = G_{14}\, dT_1 + G_{15}\, dM_1$-------------------------------- *(9)*

From equation (6)

$dT_2 = G_{41}\, dX_1 + G_{44}\, dT_1 + G_{45}\, dM_1$ -------------------------------- *(6)*

$dT_2 = 0 + G_{44}\, dT_1 + G_{45}\, dM_1$

$dT_2 = G_{44}\, dT_1 + G_{45}\, dM_1$ -------------------------------- *(10)*

From equation (9) and (10)

$\frac{dX_2}{dT_2} = \frac{G_{14}\, dT_1 + G_{15}\, dM_1}{G_{44}\, dT_1 + G_{45}\, dM_1}$ *And* $\frac{dX_2}{dT_2} = -v\sqrt{1 - \frac{\boldsymbol{C_1}^2}{v^2}\left(\frac{dT_{PL}^2}{dT_1{}^2}\right)}$

So $\frac{G_{14}\, dT_1 + G_{15}\, dM_1}{G_{44}\, dT_1 + G_{45}\, dM_1} = -v\sqrt{1 - \frac{\boldsymbol{C_1}^2}{v^2}\left(\frac{dT_{PL}^2}{dT_1{}^2}\right)}$

From equation (8) $G_{14} = -G_{11}\, v\sqrt{1 - \frac{\boldsymbol{C_1}^2}{v^2}\left(\frac{dT_{PL}^2}{dT_1{}^2}\right)} - G_{15}\frac{dM_1}{dT_1}$ -------------------------------- *(8)*

So $\frac{-G_{11}\, v dT_1\sqrt{1 - \frac{\boldsymbol{C_1}^2}{v^2}\left(\frac{dT_{PL}^2}{dT_1{}^2}\right)} - G_{15}\, dM_1 + G_{15}\, dM_1}{G_{44}\, dT_1 + G_{45}\, dM_1} = -v\sqrt{1 - \frac{\boldsymbol{C_1}^2}{v^2}\left(\frac{dT_{PL}^2}{dT_1{}^2}\right)}$

$$\frac{-G_{11}\, v dT_1 \sqrt{1-\frac{\boldsymbol{C_1}^2}{v^2}(\frac{dT_{PL}^2}{dT_1{}^2})}}{G_{44}\, dT_1 + G_{45}\, dM_1} = -v\sqrt{1-\frac{\boldsymbol{C_1}^2}{v^2}(\frac{dT_{PL}^2}{dT_1{}^2})}$$

$$\frac{G_{11}\, dT_1}{G_{44}\, dT_1 + G_{45}\, dM_1} = 1$$

$$G_{44}\, dT_1 + G_{45}\, dM_1 = G_{11}\, dT_1$$

$G_{44} = G_{11} - G_{45}\,\frac{dM_1}{dT_1}$-------------------------------- *(11)*

From equations (6), (7)

$dT_2 = G_{41}\, dX_1 + G_{44}\, dT_1 + G_{45}\, dM_1$ -------------------------------- *(6)*

$dM_2 = G_{51}\, dX_1 + G_{54}\, dT_1 + G_{55}\, dM_1$ -------------------------------- *(7)*

$$dX_1 = 0$$

$$dT_2 = G_{44}\, dT_1 + G_{45}\, dM_1$$

$$dM_2 = G_{54}\, dT_1 + G_{55}\, dM_1$$

So

$\frac{dM_2}{dT_2} = \frac{G_{54}\, dT_1 + G_{55}\, dM_1}{G_{44}\, dT_1 + G_{45}\, dM_1}$ *And* $\frac{dM_2}{dT_2} = \frac{dM_1}{dT_1}$

$$\frac{dM_1}{dT_1} = \frac{G_{54}\, dT_1 + G_{55}\, dM_1}{G_{44}\, dT_1 + G_{45}\, dM_1}$$

$$\frac{dM_1}{dT_1} = \frac{G_{54} + G_{55}\,\frac{dM_1}{dT_1}}{G_{44} + G_{45}\,\frac{dM_1}{dT_1}}$$

From

$G_{44} = G_{11} - G_{45}\,\frac{dM_1}{dT_1}$-------------------------------- *(11)*

$$\frac{dM_1}{dT_1} = \frac{G_{54} + G_{55}\,\frac{dM_1}{dT_1}}{G_{11} - G_{45}\,\frac{dM_1}{dT_1} + G_{45}\,\frac{dM_1}{dT_1}}$$

$$\frac{dM_1}{dT_1} = \frac{G_{54} + G_{55}\,\frac{dM_1}{dT_1}}{G_{11}}$$

$$G_{54} + G_{55}\frac{dM_1}{dT_1} = G_{11}\frac{dM_1}{dT_1}$$

$$G_{54} = G_{11}\frac{dM_1}{dT_1} - G_{55}\frac{dM_1}{dT_1} \text{--------------------------------} (12)$$

From (5), (7)

$$dX_2 = G_{11}\,dX_1 + G_{14}\,dT_1 + G_{15}\,dM_1 \text{--------------------------------} (5)$$

$$G_{14} = -G_{11}\,v\sqrt{1 - \frac{C_1{}^2}{v^2}\left(\frac{dT_{PL}^2}{dT_1{}^2}\right)} - G_{15}\frac{dM_1}{dT_1} \text{--------------------------------} (8)$$

$$dX_2 = G_{11}\,dX_1 - G_{11}\,v dT_1\sqrt{1 - \frac{C_1{}^2}{v^2}\left(\frac{dT_{PL}^2}{dT_1{}^2}\right)} - G_{15}\,dM_1 + G_{15}\,dM_1$$

$$dX_2 = G_{11}\,dX_1 - G_{11}\,v dT_1\sqrt{1 - \frac{C_1{}^2}{v^2}\left(\frac{dT_{PL}^2}{dT_1{}^2}\right)}$$

$$dX_2 = G_{11}\left[dX_1 - v dT_1\sqrt{1 - \frac{C_1{}^2}{v^2}\left(\frac{dT_{PL}^2}{dT_1{}^2}\right)}\right] \text{--------------------------------} (13)$$

From (6), (11)

$$dT_2 = G_{41}\,dX_1 + G_{44}\,dT_1 + G_{45}\,dM_1 \text{--------------------------------} (6)$$

$$G_{44} = G_{11} - G_{45}\frac{dM_1}{dT_1} \text{--------------------------------} (11)$$

$$dT_2 = G_{41}\,dX_1 + G_{11}\,dT_1 - G_{45}\,dM_1 + G_{45}\,dM_1$$

$$dT_2 = G_{41}\,dX_1 + G_{11}\,dT_1 \text{--------------------------------} (14)$$

$$dM_2 = G_{51}\,dX_1 + G_{54}\,dT_1 + G_{55}\,dM_1 \text{--------------------------------} (7)$$

$$G_{54} = G_{11}\frac{dM_1}{dT_1} - G_{55}\frac{dM_1}{dT_1} \text{--------------------------------} (12)$$

$$dM_2 = G_{51}\,dX_1 + G_{11}\,dM_1 - G_{55}\,dM_1 + G_{55}\,dM_1$$

$$dM_2 = G_{51}\,dX_1 + G_{11}\,dM_1 \text{--------------------------------} (15)$$

$$\boldsymbol{dX_1{}^2 - C_1{}^2 dT_1{}^2 - \frac{G_1{}^2}{C_1{}^4} dM_1{}^2 = dX_2{}^2 - C_2{}^2 dT_2{}^2 - \frac{G_2{}^2}{C_2{}^4} dM_2{}^2} \text{--------------------------------} \boldsymbol{(4)}$$

From (12), (13), (14)

$$dX_2 = G_{11}\left[dX_1 - v dT_1\sqrt{1 - \frac{C_1{}^2}{v^2}\left(\frac{dT_{PL}^2}{dT_1{}^2}\right)}\right] \text{--------------------------------} (13)$$

$$dT_2 = G_{41}\,dX_1 + G_{11}\,dT_1 \text{--------------------------------} (14)$$

$dM_2 = G_{51}\, dX_1 + G_{11}\, dM_2 \frac{dT_1}{dT_2}$-------------------------------- *(15)*

$$\boldsymbol{dX_1}^2 - \boldsymbol{C_1}^2 \boldsymbol{dT_1}^2 - \frac{\boldsymbol{G_1}^2}{\boldsymbol{C_1}^4} \boldsymbol{dM_1}^2$$

$$= (G_{11}\,[dX_1 - v dT_1 \sqrt{1 - \frac{\boldsymbol{C_1}^2}{v^2}\left(\frac{dT_{PL}^2}{dT_1^{\ 2}}\right)}])^{\ 2} - \boldsymbol{C_2}^2 (G_{41}\, dX_1 + G_{11}\, dT_1)^2 - \frac{\boldsymbol{G_2}^2}{\boldsymbol{C_2}^4}(G_{51}\, dX_1 + G_{11}\, dM_2 \frac{dT_1}{dT_2})^2$$

-------------------------------- *(16)*

Compare the coefficient of $dX_1^{\ 2}$

$$1 = G_{11}^{\ \ 2} - C_2^{\ 2} (G_{41})^2 - \frac{\boldsymbol{G_2}^2}{\boldsymbol{C_2}^4} (G_{51})^2$$

$$G_{11}^{\ \ 2} = 1 + C_2^{\ 2} (G_{41})^2 + \frac{\boldsymbol{G_2}^2}{\boldsymbol{C_2}^4} (G_{51})^2$$

-------------------------------- *(17)*

Compare the coefficient of $dX_1 dT_1$

$$0 = -2v \sqrt{1 - \frac{\boldsymbol{C_1}^2}{v^2} (\frac{dT_{PL}^2}{dT_1^{\ 2}})} G_{11}^{\ \ 2} - 2C_2^{\ 2} (G_{41}\, G_{11})$$

$$0 = v \sqrt{1 - \frac{\boldsymbol{C_1}^2}{v^2} (\frac{dT_{PL}^2}{dT_1^{\ 2}})} G_{11}^{\ \ 2} + C_2^{\ 2} (G_{41}\, G_{11})$$

$$v \sqrt{1 - \frac{\boldsymbol{C_1}^2}{v^2} (\frac{dT_{PL}^2}{dT_1^{\ 2}})} G_{11}^{\ \ 2} = -C_2^{\ 2} (G_{41}\, G_{11})$$

$$v \sqrt{1 - \frac{\boldsymbol{C_1}^2}{v^2} (\frac{dT_{PL}^2}{dT_1^{\ 2}})} G_{11} = -C_2^{\ 2} (G_{41})$$

$$G_{11} = \frac{-C_2^{\ 2}}{v \sqrt{1 - \frac{\boldsymbol{C_1}^2}{v^2} (\frac{dT_{PL}^2}{dT_1^{\ 2}})}} (G_{41})$$

$G_{41} = \frac{-v \sqrt{1 - \frac{\boldsymbol{C_1}^2}{v^2} (\frac{dT_{PL}^2}{dT_1^{\ 2}})}}{C_2^{\ 2}} (G_{11})$ -------------------------------- *(18)*

$dT_2 = G_{41}\, dX_1 + G_{11}\, dT_1$-------------------------------- *(14)*

$$dT_2 = \frac{-v\sqrt{1-\frac{\boldsymbol{C_1}^2}{v^2}(\frac{dT_{PL}^2}{dT_1{}^2})}}{C_2{}^2}(G_{11})\, dX_1 + G_{11}\, dT_1$$

$$dT_2 = G_{11}\,(dT_1 - \frac{v\sqrt{1-\frac{\boldsymbol{C_1}^2}{v^2}\left(\frac{dT_{PL}^2}{dT_1{}^2}\right)}}{C_2{}^2} dX_1)$$ ------------------------------- *(19)*

Compare the coefficient of $dT_1{}^2$

$$-C_1{}^2 = G_{11}{}^2(-v\sqrt{1-\frac{\boldsymbol{C_1}^2}{v^2}(\frac{dT_{PL}^2}{dT_1{}^2})})^2 - C_2{}^2(G_{11})^2$$

$$-C_1{}^2 = G_{11}{}^2\left[v^2\left(1-\frac{\boldsymbol{C_1}^2}{v^2}\left(\frac{dT_{PL}^2}{dT_1{}^2}\right)-C_2{}^2\right)\right]$$

$$1 = G_{11}{}^2[\frac{\boldsymbol{-v^2}}{\boldsymbol{C_1}^2}\left(1-\frac{\boldsymbol{C_1}^2}{v^2}\left(\frac{dT_{PL}^2}{dT_1{}^2}\right)+\frac{\boldsymbol{C_2}^2}{\boldsymbol{C_1}^2}\right)]$$

$$G_{11} = \frac{1}{\sqrt{\frac{C_2{}^2}{C_1{}^2}-\frac{v^2}{C_1{}^2}(1-\frac{\boldsymbol{C_1}^2}{v^2}(\frac{dT_{PL}^2}{dT_1{}^2})}}$$ ------------------------------- *(20)*

Compare the coefficient of M^2

$$-\frac{\boldsymbol{G_1}^2}{\boldsymbol{C_1}^4} = -\frac{\boldsymbol{G_2}^2}{\boldsymbol{C_2}^4}G_{11}{}^{\boldsymbol{2}}$$ ------------------------------- *(21)*

Compare the coefficient of MX

$$\boldsymbol{0} = \boldsymbol{-2}\frac{\boldsymbol{G_2}^{\boldsymbol{2}}}{\boldsymbol{C_2}^{\boldsymbol{4}}}G_{51}\, G_{11}$$

$\boldsymbol{C_2} \neq 0$, $\boldsymbol{G_2} \neq \boldsymbol{0}$, $G_{11} \neq 0$

SO $G_{51} = 0$

$dM_2 = G_{51}\, X_1 + G_{11}\, dM_1$------------------------------- *(15)*

$dM_2 = G_{11}\, dM_1$------------------------------- *(22)*

From Equation (16)

$$G_{11}{}^2 = 1 + C_2{}^2(G_{41})^2 + \frac{\boldsymbol{G_2}^{\boldsymbol{2}}}{\boldsymbol{C_2}^{\boldsymbol{4}}}(G_{51})^2$$

------------------------------- *(17)*

$G_{51} = 0$

-------------------------------- *(23)*

So $G_{11}{}^2 = 1 + C_2{}^2 (G_{41})^2$

$$G_{41} = \frac{-v\sqrt{1-\frac{\boldsymbol{C_1}^2}{v^2}(\frac{dT_{PL}^2}{dT_1{}^2})}}{C_2{}^2}(G_{11}) \quad \text{--------------------------------} \; (18)$$

$$G_{11}{}^2 = 1 + C_2{}^2 (\frac{-v\sqrt{1-\frac{C_1{}^2}{v^2}(\frac{dT_{PL}^2}{dT_1{}^2})}}{C_2{}^2}(G_{11}))^2$$

$$G_{11}{}^2 = 1 + G_{11}{}^2 \, \frac{v^2}{C_2{}^2}(1-\frac{C_1{}^2}{v^2}\left(\frac{dT_{PL}^2}{dT_1{}^2}\right))$$

$$G_{11}{}^2 (1-\frac{v^2}{C_2{}^2}(1-\frac{C_1{}^2}{v^2}\left(\frac{dT_{PL}^2}{dT_1{}^2}\right)) = 1$$

$$G_{11} = \frac{1}{\sqrt{1-\frac{v^2}{C_2{}^2}(1-\frac{C_1{}^2}{v^2}\left(\frac{dT_{PL}^2}{dT_1{}^2}\right))}} \text{-----------------------} \; (24)$$

From (20), (24)

$$G_{11} = \frac{1}{\sqrt{\frac{C_2{}^2}{C_1{}^2}-\frac{v^2}{C_1{}^2}(1-\frac{\boldsymbol{C_1}^2}{v^2}\left(\frac{dT_{PL}^2}{dT_1{}^2}\right))}} \quad \text{--------------------------------} \; (20)$$

$$G_{11} = \frac{1}{1-\sqrt{1-\frac{v^2}{C_2{}^2}(1-\frac{C_1{}^2}{v^2}\left(\frac{dT_{PL}^2}{dT_1{}^2}\right))}} \text{-----------------------} \; (24)$$

$$\frac{1}{\sqrt{\frac{C_2{}^2}{C_1{}^2}-\frac{v^2}{C_1{}^2}(1-\frac{\boldsymbol{C_1}^2}{v^2}(\frac{dT_{PL}^2}{dT_1{}^2})}} = \frac{1}{\sqrt{1-\frac{v^2}{C_2{}^2}(1-\frac{C_1{}^2}{v^2}\left(\frac{dT_{PL}^2}{dT_1{}^2}\right)}}$$

$$\frac{C_2{}^2}{C_1{}^2}-\frac{v^2}{C_1{}^2}(1-\frac{\boldsymbol{C_1}^2}{v^2}\left(\frac{dT_{PL}^2}{dT_1{}^2}\right) = 1-\frac{v^2}{C_2{}^2}(1-\frac{C_1{}^2}{v^2}\left(\frac{dT_{PL}^2}{dT_1{}^2}\right)$$

$$\frac{C_2{}^2}{C_1{}^2}-\frac{v^2}{C_1{}^2}-\left(\frac{dT_{PL}^2}{dT_1{}^2}\right) = 1-\frac{v^2}{C_2{}^2}-\frac{C_1{}^2}{C_2{}^2}\left(\frac{dT_{PL}^2}{dT_1{}^2}\right)$$

Compare the coefficient of $\left(\frac{dT_{PL}^2}{dT_1{}^2}\right)$

$$\frac{C_1{}^2}{C_2{}^2} = 1$$

Then $C_1{}^2 = C_2{}^2$

So $C_1 = \pm C_2$

Let $C_1{}^2 = C_2{}^2 = C^2$-------------------------------- *(25)*

And $G_{11} = \gamma$

$$G_{11} = \frac{1}{\sqrt{\frac{C_2{}^2}{C_1{}^2} - \frac{v^2}{C_1{}^2}(1 - \frac{\boldsymbol{C_1}{}^2}{v^2}(\frac{dT_{PL}^2}{dT_1{}^2})}} \text{ -------------------------------- (20)}$$

$$let\ \gamma = G_{11} = \frac{1}{\sqrt{1 - \frac{v^2}{C^2}(1 - (\frac{dX_{PL}^2}{dX_1{}^2})}} \text{ -------------------------------- (26)}$$

$$dX_2 = G_{11}\,[dX_1 - v dT_1\sqrt{1 - \frac{\boldsymbol{C_1}{}^2}{v^2}\left(\frac{dT_{PL}^2}{\boldsymbol{dT_1}{}^2}\right)}] \text{ -------------------------------- (13)}$$

$$dT_2 = G_{11}\,(dT_1 - \frac{v\sqrt{1 - \frac{\boldsymbol{C_1}{}^2}{v^2}\left(\frac{dT_{PL}^2}{d\boldsymbol{T_1}{}^2}\right)}}{C_2{}^2}\, dX_1) \text{ -------------------------------- (19)}$$

$dM_2 = G_{11}\, dM_1$-------------------------------- *(22)*

$C_1{}^2 = C_2{}^2 = C^2$-------------------------------- *(25)*

$$\gamma = \frac{1}{\sqrt{1 - \frac{v^2}{C^2}(1 - (\frac{dX_{PL}^2}{dX_1{}^2})}} \text{ -------------------------------- (26)}$$

$$dX_2 = \gamma[dX_1 - v dT_1\sqrt{1 - \frac{dX_{PL}^2}{dX_1{}^2}}] \text{ -------------------------------- (27)}$$

$$dT_2 = \gamma(dT_1 - \frac{v\sqrt{1 - \frac{dX_{PL}^2}{dX_1{}^2}}}{C_2{}^2}\, dX_1) \text{ -------------------------------- (28)}$$

$dM_2 = \gamma dM_1$-------------------------------- *(29)*

And finely from (21) and (25) and (26)

$$-\frac{\boldsymbol{G_1}{}^2}{\boldsymbol{C_1}{}^4} = -\frac{\boldsymbol{G_2}{}^2}{\boldsymbol{C_2}{}^4} G_{11}{}^{\boldsymbol{2}} \text{-------------------------------- (21)}$$

Let $C_1{}^2 = C_2{}^2 = C^2$-------------------------------- *(25)*

$$\gamma = G_{11} = \frac{1}{\sqrt{1 - \frac{v^2}{C^2}(1 - (\frac{dX_{PL}^2}{dX_1{}^2}))}} \text{ -------------------------------- (26)}$$

It can be reached to

$$\frac{\boldsymbol{G_1}^2}{\boldsymbol{c^4}} = \frac{\boldsymbol{G_2}^2}{\boldsymbol{c^4}}\gamma^2$$

$$\boldsymbol{G_1}^2 = \boldsymbol{G_2}^2\gamma^2$$

$$\boldsymbol{G_2} = \boldsymbol{G_1}\frac{1}{\gamma}$$

Transformation of gravity constant between reference frames in the special theory of relativity

$$\boldsymbol{G_2} = \boldsymbol{G_1}\sqrt{1 - \frac{v^2}{C^2}(1 - \left(\frac{dX_{PL}^2}{dX_1{}^2}\right))} \quad \text{--------------------------------} \; (27)$$

Conclusion

Lorentz Transformations In the fifth dimension

$$dX_2 = \gamma[dX_1 - vdT_1\sqrt{1 - \frac{dX_{PL}^2}{dX_1{}^2}}] \quad \text{--------------------------------} \; (28)$$

$$dT_2 = \gamma(dT_1 - \frac{v\sqrt{1-\frac{dX_{PL}^2}{dX_1{}^2}}}{C_2{}^2}dX_1) \quad \text{--------------------------------} \; (29)$$

$$dM_2 = \gamma dM_1 \text{--------------------------------} \; (30)$$

$$\gamma = \frac{1}{\sqrt{1-\frac{v^2}{C^2}(1-(\frac{dX_{PL}^2}{X_1{}^2})}} \quad \text{--------------------------------} \; (31)$$

$$\boldsymbol{G_2} = \boldsymbol{G_1}\sqrt{1 - \frac{v^2}{C^2}(1 - \left(\frac{dX_{PL}^2}{dX_1{}^2}\right))} \quad \text{--------------------------------} \; (32)$$

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