12. OBSERVER'S MATHEMATICS MAXWELL ELECTRODYNAMIC EQUATIONS CHARACTERISTICS

12.1 Simplified Observer's Mathematics Lorentz transformation

For the relative orientation of the coordinate systems K and K', the $x-$ axes of both systems permanently coincide. In the present case we consider only events which are localized on the x-axis. Any such event is represented with respect to the coordinate system K by the abscissa x and the time t, and with respect to the system K' by the abscissa x' and the time t', when x and t are given. We call v the velocity with which the origin of K' is moving relative to K. A light-signal, which is proceeding along the positive axis of x, is transmitted according to the equation

$$x = c \times_n t$$

or

$$x -_n c \times_n t = 0$$

Since the same light-signal has to be transmitted relative to K' with the velocity c, the propagation relative to the system K' will be represented by the analogous formula $x' -_n c \times_n t' = 0$. At that the disappearance of $(x -_n c \times_n t)$ involves the disappearance of $(x' -_n c \times_n t')$, and vice versa. If we apply quite similar considerations to light rays which are being transmitted along the negative x-axis, we obtain the analogous condition:

$$x +_n c \times_n t = 0$$

and

$$x' +_n c \times_n t' = 0$$

And also at that the disappearance of $(x +_n c \times_n t)$ involves the disappearance of $(x' +_n c \times_n t')$, and vice versa.

Above we introduced and researched so called Observer's Mathematics Lorentz transformation.

Observer's Mathematics Lorentz transformation is represented as a the folowing system of equations, where we had to change classical approach and write down the first principal of Special Theory of Relativity using the following equalities:

(OMLT 1)

$$\begin{cases} x' -_n c \times_n t' = \lambda \times_n (x -_n c \times_n t) \\ \mu \times_n (x' +_n c \times_n t') = x +_n c \times_n t \\ y' = y \\ z' = z \end{cases}$$

where $\lambda \geq 1$, $\mu \geq 1$, and λ, μ are constants.

And λ and μ (together with x_2) are the solution of the following system of equations

(OMLT 2)

$$\begin{cases} \mu \times_n (\lambda \times_n (c -_n v)) = c +_n v \\ \mu \times_n (2 -_n \lambda \times_n x_2) = x_2 \\ \lambda \times_n (2 -_n \mu \times_n x_2) = x_2 \\ 0 < v < c \end{cases}$$

We assume that all elements of **(OMLT 1)** and **(OMLT 1)** belong to W_n.

But especially for Maxwell equations we build in this section the simplified Observer's Mathematics Lorentz transformation. We consider all events below as appurtenant to W_n for some n, and point of view belongs to W_m with $m > n$. Here we do not take numerical estimation of m, but for us it is enough that W_m observer can see all sets of numbers which we operate on each step.

We would like to say that we get relation:

$$x' -_n c \times_n t' = \lambda \times_n (x -_n c \times_n t)$$

where λ indicates a constant, $\lambda \neq 0$.

Also we would like to say that we get another relation:

$$x' +_n c \times_n t' = \mu \times_n (x +_n c \times_n t)$$

where μ indicates a constant, $\mu \neq 0$.

So, we have to write down the first principal of Special Theory of Relativity using the following equalities:

(SOMLT 1)

$$\begin{cases} x' -_n c \times_n t' = \lambda \times_n (x -_n c \times_n t) \\ x' +_n c \times_n t' = \mu \times_n (x +_n c \times_n t) \end{cases}$$

where λ, μ are constants, $\lambda, \mu \neq 0$.

We assume that all elements of these equalities belong to W_n.

The critical aspect here is that all of these statements are wrong in Observer's Mathematics, because Observer's Mathematics has zero-divisors, see **?** and **?**. For example, if we take $n = 2$, $\lambda = 0.8$ and $x -_n c \times_n t = 0.08$ then $x' -_n c \times_n t' = \lambda \times_n (x -_n c \times_n t) = 0$. Same situation takes a place with μ. Thus, if we have $|\lambda| < 1$, then the statement "the case when the relation $x' -_n c \times_n t' = \lambda \times_n (x -_n c \times_n t)$ is fulfilled in general" becomes wrong. And also if we have $|\mu| < 1$, statement "the case when the relation $x' +_n c \times_n t' = \mu \times_n (x +_n c \times_n t)$ is fulfilled in general" becomes wrong. So, the probability of **(SOMLT 1)** is less than 1.

For the origin of K' we have permanently $x' = 0$, and $x = v \times_n t$, where v is the velocity with which the origin of K' is moving relative to K, $0 < v < c$. It means:

(SOMLT 2)

$$\begin{cases} -c \times_n t' = \lambda \times_n (v \times_n t -_n c \times_n t) \\ c \times_n t' = \mu \times_n (v \times_n t +_n c \times_n t) \end{cases}$$

We assume that all elements of these equalities belong to W_n.

From here we have

$$-\lambda \times_n (v \times_n t -_n c \times_n t) = \mu \times_n (v \times_n t +_n c \times_n t)$$

After that we get

(SOMLT 2')

$$-\lambda \times_n ((v -_n c) \times_n t) +_n \zeta_1 = \mu \times_n ((v +_n c) \times_n t) +_n \zeta_2$$

where ζ_1 and ζ_2 are the random variables depend on n and m.

We assume that all elements of this equality belong to W_n.

So, the probability of equality

$$-\lambda \times_n ((v -_n c) \times_n t) = \mu \times_n ((v +_n c) \times_n t)$$

is less than 1.

After that we get

(SOMLT 2")

$$-(\lambda \times_n (v -_n c)) \times_n t +_n \zeta_1 +_n \zeta_3 = (\mu \times_n (v +_n c)) \times_n t +_n \zeta_2 +_n \zeta_4$$

where ζ_3 and ζ_4 are the random variables depend on n and m.

We assume that all elements of this equality belong to W_n.

So, the probability of equality

$$-(\lambda \times_n (v -_n c)) \times_n t = (\mu \times_n (v +_n c)) \times_n t$$

is less than 1.

After that we get

(SOMLT 2"')

$$(\lambda \times_n (c -_n v) - \mu \times_n (v +_n c)) \times_n t +_n \zeta_5 = -_n\zeta_1 -_n \zeta_3 +_n \zeta_2 +_n \zeta_4$$

where ζ_5 is the random variable depend on n and m.

We assume that all elements of this equality belong to W_n.

So, the probability of equality

$$(\lambda \times_n (c -_n v) - \mu \times_n (v +_n c)) \times_n t = 0$$

is less than 1.

After that we get

(SOMLT 2"")

$$\lambda \times_n (c -_n v) = \mu \times_n (v +_n c) +_n \zeta_6$$

where ζ_6 is the random variable depend on n and m.

We assume that all elements of this equality belong to W_n.

So, the probability of equality

(SOMLT 3)

$$\lambda \times_n (c -_n v) = \mu \times_n (v +_n c)$$

is less than 1.

Furthermore, the second principle of relativity states that, as judged from K, the length of a unit measuring-rod which is at rest with reference to K' must be exactly the same as the length, as judged from K', of a unit measuring-rod which is at rest relative to K. In order to see how the points of the x'-axis appear as viewed from K, we only require to take a "snapshot" of K' from K; this means that we have to insert a particular value of t (time of K), e.g. $t = 0$. For this value of t we then obtain from the first set of the equations

(SOMLT 4)

$$\begin{cases} x' -_n c \times_n t' = \lambda x \\ x' +_n c \times_n t' = \mu x \end{cases}$$

So,

$$c \times_n t' = x' -_n \lambda \times_n x$$

and

$$2 \times_n x' -_n \lambda \times_n x = \mu \times_n x$$

We get

$$2 \times_n x' = \lambda \times_n x +_n \mu \times_n x$$

and after that

$$2 \times_n x' = (\lambda +_n \mu) \times_n x +_n \zeta_7$$

where ζ_7 is the random variable depends on n and m.

We assume that all elements of this equality belong to W_n.

So, the probability of equality

(SOMLT 5)

$$2 \times_n x' = (\lambda +_n \mu) \times_n x$$

is less than 1.

Let's take $x'_0 = 0$, $x'_1 = 1$, then find corresponding x_0 and x_1.

$$x_0 = \zeta_8$$

where ζ_8 is the random variable depends on n and m.

So, the probability of equality

(SOMLT 6)

$$x_0 = 0$$

is less than 1.

And

$$2 = (\lambda +_n \mu) \times_n x_1 +_n \zeta_9$$

where ζ_9 is the random variable depends on n and m.

The probability of equality

(SOMLT 7)

$$2 = (\lambda +_n \mu) \times_n x_1$$

is less than 1.

But if the snapshot is to be taken from K' $(t' = 0)$, we obtain from the second set of the equations

(SOMLT 8)

$$\begin{cases} x' = \lambda \times_n (x -_n c \times_n t) \\ x' = \mu \times_n (x +_n c \times_n t) \end{cases}$$

We get

(SOMLT 9)

$$\begin{cases} x' = \lambda \times_n x -_n \lambda \times_n (c \times_n t) +_n \zeta_{10} \\ x' = \mu \times_n x +_n \mu \times_n (c \times_n t) +_n \zeta_{11} \end{cases}$$

where ζ_{10} and ζ_{11} are the random variables depend on n and m.

And

(SOMLT 10)

$$\begin{cases} x' = \lambda \times_n x -_n \lambda \times_n (c \times_n t) +_n \zeta_{10} \\ \lambda \times_n x' = \lambda \times_n (\mu \times_n x) +_n \lambda \times_n (\mu \times_n (c \times_n t)) +_n \lambda \times_n \zeta_{11} +_n \zeta_{12} \end{cases}$$

where ζ_{11} and ζ_{12} are the random variables depend on n and m.

And

(SOMLT 11)

$$\begin{cases} x' = \lambda \times_n x -_n \lambda \times_n (c \times_n t) +_n \zeta_{10} \\ \lambda \times_n x' = \lambda \times_n (\mu \times_n x) +_n \mu \times_n (\lambda \times_n (c \times_n t)) +_n \lambda \times_n \zeta_{11} +_n \zeta_{12} +_n \zeta_{13} \end{cases}$$

where ζ_{13} is the random variable depends on n and m.

And

(SOMLT 12)

$$\begin{cases} \lambda \times_n (c \times_n t) = \lambda \times_n x -_n x' +_n \zeta_{10} \\ \lambda \times_n x' = \lambda \times_n (\mu \times_n x) +_n \mu \times_n (\lambda \times_n x -_n x' +_n \zeta_{10}) +_n \lambda \times_n \zeta_{11} +_n \zeta_{12} +_n \zeta_{13} \end{cases}$$

And

(SOMLT 13)

$$\begin{cases} \lambda \times_n (c \times_n t) = \lambda \times_n x -_n x' +_n \zeta_{10} \\ \lambda \times_n x' +_n \mu \times_n x' = \lambda \times_n (\mu \times_n x) +_n \mu \times_n (\lambda \times_n x) +_n \zeta_{14} \end{cases}$$

where ζ_{14} is the random variable depends on n and m.

And

(SOMLT 14)

$$\begin{cases} \lambda \times_n (c \times_n t) = \lambda \times_n x -_n x' +_n \zeta_{10} \\ (\lambda +_n \mu) \times_n x' +_n \zeta_{15} = \lambda \times_n (\mu \times_n x) +_n \mu \times_n (\lambda \times_n x) +_n \zeta_{14} \end{cases}$$

where ζ_{15} is the random variable depends on n and m.

We assume that all elements of these equalities belong to W_n.

Let's take $x_3 = 0$, $x_4 = 1$, then find corresponding x'_3 and x'_4.

(SOMLT 15)

$$x'_3 = \zeta_{16}$$

where ζ_{16} is the random variable depends on n and m.

So, the probability of equality

(SOMLT 17)

$$x'_3 = 0$$

is less than 1.

(SOMLT 18)

$$(\lambda +_n \mu) \times_n x'_4 = \lambda \times_n \mu +_n \mu \times_n \lambda +_n \zeta_{17}$$

where ζ_{17} is the random variable depends on n and m.

We have multiplication commutativity in W_n. So, we get

(SOMLT 18')

$$(\lambda +_n \mu) \times_n x'_4 = 2 \times_n (\lambda \times_n \mu) +_n \zeta_{17}$$

So, the probability of equality

(SOMLT 19)

$$(\lambda +_n \mu) \times_n x'_4 = 2 \times_n (\lambda \times_n \mu)$$

is less than 1.

We assume that all elements of this equality belong to W_n.

But from what has been said, the two snapshots must be identical; hence x_0 must be equal to x'_3, and x_1 must be equal to x'_4, so that we obtain:

(SOMLT 20)

$$\begin{cases} x_0 = x'_3 = 0 \\ x_1 = x'_4 \end{cases}$$

By **(SOMLT 6)** and **(SOMLT 17)** we know that the probability of equality

$$x_0 = x'_3 = 0$$

is less than 1

Let's consider the equality

$$x_1 = x'_4$$

By **(SOMLT 7)** and **(SOMLT 19)** we get

(SOMLT 22)

$$\begin{cases} 2 = (\lambda +_n \mu) \times_n x_1 \\ (\lambda +_n \mu) \times_n x'_4 = 2 \times_n (\lambda \times_n \mu) \\ x_1 = x'_4 \end{cases}$$

That means

(SOMLT 23)

$$\lambda \times_n \mu = 1$$

And we know that the probability of this equality is less than 1.

So, by **(SOMLT 3)** and **(SOMLT 23)** we have a system

(SOMLT 24)

$$\begin{cases} \lambda \times_n (c -_n v) = \mu \times_n (c +_n v) \\ \lambda \times_n \mu = 1 \end{cases}$$

We get

(SOMLT 25)

$$\begin{cases} \mu \times_n (\lambda \times_n (c -_n v)) = \mu \times_n (\mu \times_n (c +_n v)) \\ \lambda \times_n \mu = 1 \end{cases}$$

And

(SOMLT 25')

$$\begin{cases} (\mu \times_n \lambda) \times_n (c -_n v) +_n \zeta_{17} = (\mu \times_n \mu) \times_n (c +_n v) +_n \zeta_{18} \\ \lambda \times_n \mu = 1 \end{cases}$$

where ζ_{17} and ζ_{18} are the random variables depend on n and m.

And

(SOMLT 25")

$$\begin{cases} c -_n v +_n \zeta_{17} = (\mu \times_n \mu) \times_n (c +_n v) +_n \zeta_{18} \\ \lambda \times_n \mu = 1 \end{cases}$$

By **(SOMLT 24)** we get

(SOMLT 26)

$$\begin{cases} \lambda \times_n (\lambda \times_n (c -_n v)) = \lambda \times_n (\mu \times_n (c +_n v)) \\ \lambda \times_n \mu = 1 \end{cases}$$

And

(SOMLT 26')

$$\begin{cases} (\lambda \times_n \lambda) \times_n (c -_n v) +_n \zeta_{19} = (\lambda \times_n \mu) \times_n (c +_n v) +_n \zeta_{20} \\ \lambda \times_n \mu = 1 \end{cases}$$

where ζ_{19} and ζ_{20} are the random variables depend on n and m.

And

(SOMLT 26")

$$\begin{cases} (\lambda \times_n \lambda) \times_n (c -_n v) +_n \zeta_{19} = (c +_n v) +_n \zeta_{20} \\ \lambda \times_n \mu = 1 \end{cases}$$

So, the probabilities of equalities

(SOMLT 27)

$$c -_n v = (\mu \times_n \mu) \times_n (c +_n v)$$

and

(SOMLT 28)

$$(\lambda \times_n \lambda) \times_n (c -_n v) = (c +_n v)$$

are less than 1.

We assume that all elements of these equalities belong to W_n.

We note:

1. The solutions of these equalities exist not always (see ?? and section 2 of this book)

2. If solution of equality **(SOMLT 27)** exists, we don't have uniqueness (see section 2 of this book)

Solution of these equations in classical Mathemativs is

(SOMLT 29)

$$\begin{cases} \lambda = \sqrt{\frac{c +_n v}{c -_n v}} \\ \mu = \sqrt{\frac{c -_n v}{c +_n v}} \end{cases}$$

We assume that all elements of these equalities belong to W_n.

But again we note that in Observer's Mathematics:

1. These numbers λ and μ exist not always. The probabilities of these numbers exist is less than 1.

2. Even in situation, when these numbers exist, the probabilities of they are the solutions of **(SOMLT 27)** and **(SOMLT 28)** are less than 1.

3. The probability of $\frac{c +_n v}{c -_n v}$ and $\frac{c -_n v}{c +_n v}$ exist is less than 1;

4. The probability of $\sqrt{\frac{c +_n v}{c -_n v}}$ and $\sqrt{\frac{c -_n v}{c +_n v}}$ exist is less than 1;

5. If μ - solution exists, it is not unique.

If we go to expressions **(SOMLT 1)** using classical Mathematics way, we get

(SOMLT 30)

$$\begin{cases} x' -_n c \times_n t' = \sqrt{\frac{c +_n v}{c -_n v}} \times_n (x -_n c \times_n t) \\ x' +_n c \times_n t' = \sqrt{\frac{c -_n v}{c +_n v}} \times_n (x +_n c \times_n t) \end{cases}$$

We assume that all elements of these equalities belong to W_n.

And

(SOMLT 31)

$$\begin{cases} x' -_n c \times_n t' = \sqrt{\frac{c +_n v}{c -_n v}} \times_n (x -_n c \times_n t) \\ 2 \times_n x' = \sqrt{\frac{c -_n v}{c +_n v}} \times_n x +_n \sqrt{\frac{c -_n v}{c +_n v}} \times_n (c \times_n t) +_n \zeta_{21} +_n \sqrt{\frac{c +_n v}{c -_n v}} \times_n x -_n \sqrt{\frac{c +_n v}{c -_n v}} \times_n (c \times_n t) +_n \zeta_{22} \end{cases}$$

where ζ_{21} and ζ_{22} are the random variables depend on n and m.

We assume that all elements of these equalities belong to W_n.

And

(SOMLT 31')

$$\begin{cases} x' -_n c \times_n t' = \sqrt{\frac{c+_n v}{c-_n v}} \times_n (x -_n c \times_n t) \\ 2 \times_n x' = \frac{\sqrt{c-_n v}}{\sqrt{c+_n v}} \times_n x +_n \frac{\sqrt{c-_n v}}{\sqrt{c+_n v}} \times_n (c \times_n t) +_n \zeta_{21} +_n \frac{\sqrt{c+_n v}}{\sqrt{c-_n v}} \times_n x -_n \frac{\sqrt{c+_n v}}{\sqrt{c-_n v}} \times_n (c \times_n t) +_n \zeta_{22} +_n \zeta_{23} \end{cases}$$

where ζ_{23} is the random variable depends on n and m.

We assume that all elements of these equalities belong to W_n.

We have to note that:

1. Even if $\sqrt{\frac{c+_n v}{c-_n v}}$ or $\sqrt{\frac{c-_n v}{c+_n v}}$ exist, probability of $\sqrt{c +_n v}$ or $\sqrt{c -_n v}$ exist is less than 1;

2. The probabilities of $\frac{\sqrt{c+_n v}}{\sqrt{c-_n v}}$ or $\frac{\sqrt{c-_n v}}{\sqrt{c+_n v}}$ exist is less than 1.

3. The probabilities of equalities

$$\sqrt{\frac{c +_n v}{c -_n v}} = \frac{\sqrt{c +_n v}}{\sqrt{c -_n v}}$$

or

$$\sqrt{\frac{c -_n v}{c +_n v}} = \frac{\sqrt{c -_n v}}{\sqrt{c +_n v}}$$

are less than 1 (in spite of all numbers in these equalities exist).

4.The probability of **(SOMLT 31')** is equal to **(SOMLT 31)**is less than 1.

After that we get

(SOMLT 31")

$$\begin{cases} x' -_n c \times_n t' = \sqrt{\frac{c+_n v}{c-_n v}} \times_n (x -_n c \times_n t) \\ x' = \frac{x -_n v \times_n t}{\sqrt{1 -_n \frac{v \times_n v}{c \times_n c}}} +_n \zeta_{21} +_n \zeta_{22} +_n \zeta_{23} +_n \zeta_{24} \end{cases}$$

where ζ_{24} is the random variable depends on n and m.

We assume that all elements of these equalities belong to W_n.

We have to note that:

1. The probability of equality

$$\frac{\sqrt{c -_n v}}{\sqrt{c +_n v}} \times_n x +_n \frac{\sqrt{c +_n v}}{\sqrt{c -_n v}} \times_n x = \left(\frac{\sqrt{c -_n v}}{\sqrt{c +_n v}} +_n \frac{\sqrt{c +_n v}}{\sqrt{c -_n v}}\right) \times_n x$$

is less than 1.

2. The probability of equality

$$\frac{\sqrt{c -_n v}}{\sqrt{c +_n v}} = \frac{\sqrt{c -_n v} \times_n \sqrt{c -_n v}}{\sqrt{c -_n v} \times_n \sqrt{c +_n v}}$$

is less than 1.

3. The probability of equality

$$\frac{\sqrt{c +_n v}}{\sqrt{c -_n v}} = \frac{\sqrt{c +_n v} \times_n \sqrt{c +_n v}}{\sqrt{c +_n v} \times_n \sqrt{c -_n v}}$$

is less than 1.

4. The probability of equality

$$\sqrt{c -_n v} \times_n \sqrt{c +_n v} = \sqrt{(c -_n v) \times_n (c +_n v)}$$

is less than 1.

5. The probability of equality

$$(c -_n v) \times_n (c +_n v) = c \times_n c -_n v \times_n v$$

is less than 1.

6. The probability of equality

$$\sqrt{c \times_n c -_n v \times_n v} = c \times_n \sqrt{1 -_n \frac{v \times_n v}{c \times_n c}}$$

is less than 1.

7. The probability of fraction's existing

$$\frac{1}{c \times_n \sqrt{1 -_n \frac{v \times_n v}{c \times_n c}}}$$

is less than 1.

8. The probability of equality

$$(\frac{\sqrt{c -_n v}}{\sqrt{c +_n v}} +_n \frac{\sqrt{c +_n v}}{\sqrt{c -_n v}}) \times_n x = \frac{2 \times x}{\sqrt{1 -_n \frac{v \times_n v}{c \times_n c}}}$$

is less than 1.

9. The probability of equality

$$\frac{\sqrt{c -_n v}}{\sqrt{c +_n v}} \times_n (c \times_n t) -_n \frac{\sqrt{c +_n v}}{\sqrt{c -_n v}} \times_n (c \times_n t) = (\frac{\sqrt{c -_n v}}{\sqrt{c +_n v}} -_n \frac{\sqrt{c +_n v}}{\sqrt{c -_n v}}) \times_n (c \times_n t)$$

is less than 1.

10. The probability of equality

$$v \times_n (c \times_n t) = c \times_n (v \times_n t)$$

is less than 1.

11. The probability of equality

$$(\frac{\sqrt{c -_n v}}{\sqrt{c +_n v}} -_n \frac{\sqrt{c +_n v}}{\sqrt{c -_n v}}) \times_n (c \times_n t) = \frac{-2 \times_n (v \times_n t)}{\sqrt{1 -_n \frac{v \times_n v}{c \times_n c}}}$$

is less than 1.

And

(SOMLT 31"')

$$\begin{cases} x' -_n c \times_n t' = \sqrt{\frac{c +_n v}{c -_n v}} \times_n (x -_n c \times_n t) \\ x' = \frac{x -_n v \times_n t}{\sqrt{1 -_n \frac{v \times_n v}{c \times_n c}}} +_n \zeta_{25} \end{cases}$$

where $\zeta_{25} = \zeta_{21} +_n \zeta_{22} +_n \zeta_{23} +_n \zeta_{24}$ is a random variable depends on n and m.

We assume that all elements of these equalities belong to W_n.

If we go another way starting from the expressions **(SOMLT 1)** and again using classical Mathematics way, we get

(SOMLT 32)

$$\begin{cases} x' -_n c \times_n t' = \sqrt{\frac{c +_n v}{c -_n v}} \times_n (x -_n c \times_n t) \\ -2 \times_n (c \times_n t') = \sqrt{\frac{c +_n v}{c -_n v}} \times_n x -_n \sqrt{\frac{c +_n v}{c -_n v}} \times_n (c \times_n t) +_n \zeta_{26} -_n \sqrt{\frac{c -_n v}{c +_n v}} \times_n x -_n \sqrt{\frac{c -_n v}{c +_n v}} \times_n (c \times_n t) +_n \zeta_{27} \end{cases}$$

where ζ_{26} and ζ_{27} are the random variables depend on n and m.

We assume that all elements of these equalities belong to W_n.

And

(SOMLT 32')

$$\begin{cases} x' -_n c \times_n t' = \sqrt{\frac{c +_n v}{c -_n v}} \times_n (x -_n c \times_n t) \\ -2 \times_n (c \times_n t') = \frac{\sqrt{c +_n v}}{\sqrt{c -_n v}} \times_n x -_n \frac{\sqrt{c +_n v}}{\sqrt{c -_n v}} \times_n (c \times_n t) +_n \zeta_{26} -_n \frac{\sqrt{c -_n v}}{\sqrt{c +_n v}} \times_n x -_n \frac{\sqrt{c -_n v}}{\sqrt{c +_n v}} \times_n (c \times_n t) +_n \zeta_{27} +_n \zeta_{28} \end{cases}$$

where ζ_{28} is a random variable depends on n and m.

We assume that all elements of these equalities belong to W_n.

We have to note that:

1. Even if $\sqrt{\frac{c+_n v}{c-_n v}}$ or $\sqrt{\frac{c-_n v}{c+_n v}}$ exist, probability of $\sqrt{c+_n v}$ or $\sqrt{c-_n v}$ exist is less than 1;

2. The probabilities of $\frac{\sqrt{c+_n v}}{\sqrt{c-_n v}}$ or $\frac{\sqrt{c-_n v}}{\sqrt{c+_n v}}$ exist is less than 1.

3. The probabilities of equalities

$$\sqrt{\frac{c+_n v}{c-_n v}} = \frac{\sqrt{c+_n v}}{\sqrt{c-_n v}}$$

or

$$\sqrt{\frac{c-_n v}{c+_n v}} = \frac{\sqrt{c-_n v}}{\sqrt{c+_n v}}$$

are less than 1 (in spite of all numbers in these equalities exist).

4.The probability of **(SOMLT 32')** is equal to **(SOMLT 32)**is less than 1.

After that we get

And

(SOMLT 32")

$$\begin{cases} x' -_n c \times_n t' = \sqrt{\frac{c+_n v}{c-_n v}} \times_n (x -_n c \times_n t) \\ t' = \frac{-\frac{v}{c \times_n c} \times_n x +_n t}{\sqrt{1 -_n \frac{v \times_n v}{c \times_n c}}} +_n \zeta_{29} \end{cases}$$

where ζ_{29} is the random variable depends on n and m.

We assume that all elements of these equalities belong to W_n.

We have to note that:

1. The probability of equality

$$\frac{\sqrt{c+_n v}}{\sqrt{c-_n v}} \times_n x -_n \frac{\sqrt{c-_n v}}{\sqrt{c+_n v}} \times_n x = \left(\frac{\sqrt{c+_n v}}{\sqrt{c-_n v}} -_n \frac{\sqrt{c-_n v}}{\sqrt{c+_n v}}\right) \times_n x$$

is less than 1.

2. The probability of equality

$$\frac{\sqrt{c-_n v}}{\sqrt{c+_n v}} = \frac{\sqrt{c-_n v} \times_n \sqrt{c-_n v}}{\sqrt{c-_n v} \times_n \sqrt{c+_n v}}$$

is less than 1.

3. The probability of equality

$$\frac{\sqrt{c +_n v}}{\sqrt{c -_n v}} = \frac{\sqrt{c +_n v} \times_n \sqrt{c +_n v}}{\sqrt{c +_n v} \times_n \sqrt{c -_n v}}$$

is less than 1.

4. The probability of equality

$$\sqrt{c -_n v} \times_n \sqrt{c +_n v} = \sqrt{(c -_n v) \times_n (c +_n v)}$$

is less than 1.

5. The probability of equality

$$(c -_n v) \times_n (c +_n v) = c \times_n c -_n v \times_n v$$

is less than 1.

6. The probability of equality

$$\sqrt{c \times_n c -_n v \times_n v} = c \times_n \sqrt{1 -_n \frac{v \times_n v}{c \times_n c}}$$

is less than 1.

7. The probability of fraction's existing

$$\frac{1}{c \times_n \sqrt{1 -_n \frac{v \times_n v}{c \times_n c}}}$$

is less than 1.

8. The probability of equality

$$(\frac{\sqrt{c +_n v}}{\sqrt{c -_n v}} -_n \frac{\sqrt{c -_n v}}{\sqrt{c +_n v}}) \times_n x = \frac{2 \times_n (v \times_n x)}{c \times_n \sqrt{1 -_n \frac{v \times_n v}{c \times_n c}}}$$

is less than 1.

9. The probability of equality

$$-\frac{\sqrt{c -_n v}}{\sqrt{c +_n v}} \times_n (c \times_n t) -_n \frac{\sqrt{c +_n v}}{\sqrt{c -_n v}} \times_n (c \times_n t) = (-\frac{\sqrt{c -_n v}}{\sqrt{c +_n v}} -_n \frac{\sqrt{c +_n v}}{\sqrt{c -_n v}}) \times_n (c \times_n t)$$

is less than 1.

10. The probability of equality

$$(-\frac{\sqrt{c -_n v}}{\sqrt{c +_n v}} -_n \frac{\sqrt{c +_n v}}{\sqrt{c -_n v}}) \times_n (c \times_n t) = \frac{-2 \times_n (c \times_n t)}{\sqrt{1 -_n \frac{v \times_n v}{c \times_n c}}}$$

is less than 1.

So, simplified Observer's Mathematics Lorentz transformation may be represent as the following:

(SOMLT 33)

$$\begin{cases} x' = \frac{x -_n v \times_n t}{\sqrt{1 -_n \frac{v \times_n v}{c \times_n c}}} +_n \zeta_{25} \\ t' = \frac{-\frac{v}{c \times_n c} \times_n x +_n t}{\sqrt{1 -_n \frac{v \times_n v}{c \times_n c}}} +_n \zeta_{29} \\ y' = y \\ z' = z \end{cases}$$

We assume that all elements of these equalities belong to W_n.

And the probability of standard Lorentz transformation expression

(SOMLT 34)

$$\begin{cases} x' = \frac{x -_n v \times_n t}{\sqrt{1 -_n \frac{v \times_n v}{c \times_n c}}} \\ t' = \frac{-\frac{v}{c \times_n c} \times_n x +_n t}{\sqrt{1 -_n \frac{v \times_n v}{c \times_n c}}} \\ y' = y \\ z' = z \end{cases}$$

is less than 1.

We assume that all elements of these equalities belong to W_n.

Simplified Observer's Mathematics Lorentz transformation (from coordinate system K' to coordinate system K) may be represent as the following:

(SOMLT 35)

$$\begin{cases} x = \frac{x' +_n v \times_n t'}{\sqrt{1 -_n \frac{v \times_n v}{c \times_n c}}} +_n \zeta_{30} \\ t = \frac{\frac{v}{c \times_n c} \times_n x' +_n t'}{\sqrt{1 -_n \frac{v \times_n v}{c \times_n c}}} +_n \zeta_{31} \\ y = y' \\ z = z' \end{cases}$$

where ζ_{30} and ζ_{31} are the random variables depend on n and m.

We assume that all elements of these equalities belong to W_n.

And the probability of standard Lorentz transformation expression (from coordinate system K' to coordinate system K)

(SOMLT 36)

$$\begin{cases} x = \frac{x' +_n v \times_n t'}{\sqrt{1 -_n \frac{v \times_n v}{c \times_n c}}} \\ t = \frac{\frac{v}{c \times_n c} \times_n x' +_n t'}{\sqrt{1 -_n \frac{v \times_n v}{c \times_n c}}} \\ y = y' \\ z = z' \end{cases}$$

is less than 1.

We assume that all elements of these equalities belong to W_n.

12.2 Simplified Observer's Mathematics Lorentz transformation of electromagnetic fields

Also as we showed above we can write down simplified Lorentz transformation in Observer's Mathematics as the follow:

(SOMLT 33)

$$\begin{cases} x' = \frac{x -_n v \times_n t}{\sqrt{1 -_n \frac{v \times_n v}{c \times_n c}}} +_n \zeta_{25} \\ t' = \frac{-\frac{v}{c \times_n c} \times_n x +_n t}{\sqrt{1 -_n \frac{v \times_n v}{c \times_n c}}} +_n \zeta_{29} \\ y' = y \\ z' = z \end{cases}$$

and inverse

(SOMLT 35)

$$\begin{cases} x = \frac{x' +_n v \times_n t'}{\sqrt{1 -_n \frac{v \times_n v}{c \times_n c}}} +_n \zeta_{30} \\ t = \frac{\frac{v}{c \times_n c} \times_n x' +_n t'}{\sqrt{1 -_n \frac{v \times_n v}{c \times_n c}}} +_n \zeta_{31} \\ y = y' \\ z = z' \end{cases}$$

Let's introduce standard for classical Lorentz transformation variables:

$$\beta = \frac{v}{c}$$

and

$$\gamma = \frac{1}{\sqrt{1 -_n (\beta \times_n \beta)}}$$

and

$$\alpha = \beta \times_n \gamma$$

And rewrite simplified Lorentz transformation in Observer's Mathematics as the follow:

(SOMLT 33')

$$\begin{cases} c \times_n t' = \gamma \times_n (c \times_n t -_n \beta \times_n x) +_n \zeta_{32} \\ x' = \gamma \times_n (x -_n \beta \times_n (c \times_n t)) +_n \zeta_{33} \\ y' = y \\ z' = z \end{cases}$$

and

(SOMLT 35')

$$\begin{cases} c \times_n t = \gamma \times_n (c \times_n t' +_n \beta \times_n x') +_n \zeta_{34} \\ x = \gamma \times_n (x' +_n \beta \times_n (c \times_n t')) +_n \zeta_{35} \\ y = y' \\ z = z' \end{cases}$$

where ζ_{32}, ζ_{33}, ζ_{34} and ζ_{35} are random variables depend on n and m.

So,

(SOMLT 33")

$$\begin{cases} c \times_n t' = \gamma \times_n (c \times_n t) -_n (\gamma \times_n \beta) \times_n x +_n \zeta_{36} \\ x' = -(\gamma \times_n \beta) \times_n (c \times_n t) +_n \gamma \times_n x +_n \zeta_{37} \\ y' = y \\ z' = z \end{cases}$$

and

(SOMLT 35")

$$\begin{cases} c \times_n t = \gamma \times_n (c \times_n t') +_n (\gamma \times_n \beta) \times_n x' +_n \zeta_{38} \\ x = (\gamma \times_n \beta) \times_n (c \times_n t') +_n \gamma \times_n x' +_n \zeta_{39} \\ y = y' \\ z = z' \end{cases}$$

where ζ_{36}, ζ_{37}, ζ_{38} and ζ_{39} are random variables depend on n and m.

So, the probability of correctness of the following system

(SOMLT 33"')

$$\begin{cases} c \times_n t' = \gamma \times_n (c \times_n t) -_n (\gamma \times_n \beta) \times_n x \\ x' = -(\gamma \times_n \beta) \times_n (c \times_n t) +_n \gamma \times_n x \\ y' = y \\ z' = z \end{cases}$$

is less than 1.

And the probability of correctness of the following system

(SOMLT 35"')

$$\begin{cases} c \times_n t = \gamma \times_n (c \times_n t') +_n (\gamma \times_n \beta) \times_n x' \\ x = (\gamma \times_n \beta) \times_n (c \times_n t') +_n \gamma \times_n x' \\ y = y' \\ z = z' \end{cases}$$

is less than 1.

Let's consider the Lorentz transformation matrix from coordinate system K to coordinate system K' in classical Mathematics (see **(SOMLT 33"')**):

(INV 1) $L = L^i_k = \begin{bmatrix} \gamma & -\gamma \times_n \beta & 0 & 0 \\ -\gamma \times_n \beta & \gamma & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$

If we denote column

$K_{variables} = \begin{bmatrix} c \times_n t \\ x \\ y \\ z \end{bmatrix}$

as

$W = \begin{bmatrix} w^0 \\ w^1 \\ w^2 \\ w^3 \end{bmatrix}$

and if we denote column

$K'_{variables} = \begin{bmatrix} c \times_n t' \\ x' \\ y' \\ z' \end{bmatrix}$

as

$W' = \begin{bmatrix} w'^0 \\ w'^1 \\ w'^2 \\ w'^3 \end{bmatrix}$

If we introduce column

$\Omega^1 = \begin{bmatrix} \zeta_{36} \\ \zeta_{37} \\ 0 \\ 0 \end{bmatrix}$

then we get the simplified Observer's Mathematics Lorentz transformation on matrix form:

(INV 2)

$$W' = L \times_n W +_n \Omega^1$$

We assume that all elements of this equality belong to W_n.

So, the probability of equality

(INV 2')

$$W' = L \times_n W$$

is less than 1.

Let's coordinates of vectors **E**, **H** and **j** in coordinate system K will be

$$\mathbf{E} = (E_x, E_y, E_z), \mathbf{H} = (H_x, H_y, H_z), \mathbf{J} = (J_x, J_y, J_z)$$

and in coordinate system K' will be

$$\mathbf{E} = (E'_x, E'_y, E'_z), \mathbf{H} = (H'_x, H'_y, H'_z), \mathbf{J} = (J'_x, J'_y, J'_z)$$

As we introduced above the electromagnetic field tensor $F = F^{ik}$ may be represent in coordinate system K as

(L18) $F = F^{ik} = \begin{bmatrix} 0 & E_x & E_y & E_z \\ -E_x & 0 & H_z & -H_y \\ -E_y & -H_z & 0 & H_x \\ -E_z & H_y & -H_x & 0 \end{bmatrix}$

Let's the electromagnetic field tensor in coordinate system K' is $F' = F'^{ij}$.

By **(N11)** and **(N12)** we get

(INV 3)

$$F'^{ij} = (\partial w'^{i}/\partial w^{k} \times_n \partial w'^{j}/\partial w^{l}) \times_n F^{kl} +_n \Omega_2^{ij}$$

where $i, j \in (0, 1, 2, 3)$ and summation is by all $k, l \in (0, 1, 2, 3)$,

and where

$\Omega_2 = \Omega_2^{ij} = \begin{bmatrix} \zeta_{38} & \zeta_{39} & \zeta_{40} & \zeta_{41} \\ \zeta_{42} & \zeta_{43} & \zeta_{44} & \zeta_{45} \\ \zeta_{46} & \zeta_{47} & \zeta_{48} & \zeta_{49} \\ \zeta_{50} & \zeta_{51} & \zeta_{52} & \zeta_{53} \end{bmatrix}$

where $\zeta_{38}, ..., \zeta_{53}$ are random variables depend on n and m.

We assume that all elements of this equality belong to W_n.

So, the probability of equality

(INV 3')

$$F' = F'^{ij} = (\partial w'^{i}/\partial w^{k} \times_n \partial w'^{j}/\partial w^{l}) \times_n F^{kl}$$

is less than 1.

We can write down now

(INV 4)

$$F' = F'^{ij} = (L_k^i \times_n L_l^j) \times_n F^{kl} +_n \Omega_3^{ij}$$

where again $i, j \in (0, 1, 2, 3)$ and summation is by all $k, l \in (0, 1, 2, 3)$,

and where

$\Omega_3 = \Omega_3^{ij} = \begin{bmatrix} \zeta_{54} & \zeta_{55} & \zeta_{56} & \zeta_{57} \\ \zeta_{58} & \zeta_{59} & \zeta_{60} & \zeta_{61} \\ \zeta_{62} & \zeta_{63} & \zeta_{64} & \zeta_{65} \\ \zeta_{66} & \zeta_{67} & \zeta_{68} & \zeta_{69} \end{bmatrix}$

where $\zeta_{54}, ..., \zeta_{69}$ are random variables depend on n and m.

We assume that all elements of this equality belong to W_n.

So, the probability of equality

(INV 4')

$$F' = F'^{ij} = (L_k^i \times_n L_l^j) \times_n F^{kl}$$

is less than 1.

I.e.

(INV 5)

$$F' = L \times_n (F \times_n L^T) +_n \Omega_3 = L \times_n (F \times_n L) +_n \Omega_3$$

because

$$L^T = L$$

So, the probability of equality

(INV 5')

$$F' = L \times_n (F \times_n L)$$

is less than 1.

And we get

(INV 6)

$$F' = C +_n \Omega_4$$

where

$C =$

$$\begin{bmatrix} 0 & E_x & \gamma \times_n E_y -_n \alpha \times_n H_z & \gamma \times_n E_z +_n \alpha \times_n H_y \\ -E_x & 0 & -\alpha \times_n E_y +_n \gamma \times_n H_z & -\alpha \times_n E_z -_n \gamma \times_n H_y \\ -\gamma \times_n E_y +_n \alpha \times_n H_z & \alpha \times_n E_y -_n \gamma \times_n H_z & 0 & H_x \\ -\gamma \times_n E_z -_n \alpha \times_n H_y & \alpha \times_n E_z +_n \gamma \times_n H_y & -H_x & 0 \end{bmatrix}$$

and

$$\Omega_4 = \Omega_4^{ij} = \begin{bmatrix} \zeta_{70} & \zeta_{71} & \zeta_{72} & \zeta_{73} \\ \zeta_{74} & \zeta_{75} & \zeta_{76} & \zeta_{77} \\ \zeta_{78} & \zeta_{79} & \zeta_{80} & \zeta_{81} \\ \zeta_{82} & \zeta_{83} & \zeta_{84} & \zeta_{85} \end{bmatrix}$$

where $\zeta_{70}, ..., \zeta_{85}$ are random variables depend on n and m.

We assume that all elements of this equality belong to W_n.

So, the probability of equality

(INV 6')

$F' =$

$$\begin{bmatrix} 0 & E_x & \gamma \times_n E_y -_n \alpha \times_n H_z & \gamma \times_n E_z +_n \alpha \times_n H_y \\ -E_x & 0 & -\alpha \times_n E_y +_n \gamma \times_n H_z & -\alpha \times_n E_z -_n \gamma \times_n H_y \\ -\gamma \times_n E_y +_n \alpha \times_n H_z & \alpha \times_n E_y -_n \gamma \times_n H_z & 0 & H_x \\ -\gamma \times_n E_z -_n \alpha \times_n H_y & \alpha \times_n E_z +_n \gamma \times_n H_y & -H_x & 0 \end{bmatrix}$$

is less than 1.

And we get

(INV 7)

$$E'_x = E_x +_n \zeta_{86}$$

$$E'_y = \gamma \times_n E_y -_n \alpha \times_n H_z +_n \zeta_{87} = \gamma \times_n E_y -_n (\gamma \times_n \beta) \times_n H_z +_n \zeta_{87}$$

$$E'_z = \gamma \times_n E_z +_n \alpha \times_n H_y +_n \zeta_{88} = \gamma \times_n E_z +_n (\gamma \times_n \beta) \times_n H_y +_n \zeta_{88}$$

$$H'_x = H_x +_n \zeta_{89}$$

$$H'_y = \alpha \times_n E_z +_n \gamma \times_n H_y +_n \zeta_{90} = (\gamma \times_n \beta) \times_n E_z +_n \gamma \times_n H_y +_n \zeta_{90}$$

$$H'_z = -\alpha \times_n E_y +_n \gamma \times_n H_z +_n \zeta_{91} = -(\gamma \times_n \beta) \times_n E_y +_n \gamma \times_n H_z +_n \zeta_{91}$$

where $\zeta_{86}, ..., \zeta_{91}$ are random variables depend on n and m.

So, the probability of equalities

(INV 7')

$$E'_x = E_x$$

$$E'_y = \gamma \times_n E_y -_n \alpha \times_n H_z = \gamma \times_n E_y -_n (\gamma \times_n \beta) \times_n H_z$$

$$E'_z = \gamma \times_n E_z +_n \alpha \times_n H_y = \gamma \times_n E_z +_n (\gamma \times_n \beta) \times_n H_y$$

$$H'_x = H_x$$

$$H'_y = \alpha \times_n E_z +_n \gamma \times_n H_y = (\gamma \times_n \beta) \times_n E_z +_n \gamma \times_n H_y$$

$$H'_z = -\alpha \times_n E_y +_n \gamma \times_n H_z = -(\gamma \times_n \beta) \times_n E_y +_n \gamma \times_n H_z$$

is less than 1.

Let's consider now the Lorentz transformation matrix from coordinate system K' to coordinate system K in classical Mathematics (see **(SOMLT 35"')**):

(INV 8) $L' = L'^i_k = \begin{bmatrix} \gamma & \gamma \times_n \beta & 0 & 0 \\ \gamma \times_n \beta & \gamma & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$

If we introduce column

$\Omega'^1 = \begin{bmatrix} \zeta_{38} \\ \zeta_{39} \\ 0 \\ 0 \end{bmatrix}$

then we get the simplified Observer's Mathematics Lorentz transformation on matrix form:

(INV 9)

$$W = L' \times_n W' +_n \Omega'^1$$

We assume that all elements of this equality belong to W_n.

So, the probability of equality

(INV 9')

$$W = L' \times_n W'$$

is less than 1.

The electromagnetic field tensor $F' = F'^{ik}$ may be represent in coordinate system K' as

$F' = F'^{ik} = \begin{bmatrix} 0 & E'_x & E'_y & E'_z \\ -E'_x & 0 & H'_z & -H'_y \\ -E'_y & -H'_z & 0 & H'_x \\ -E'_z & H'_y & -H'_x & 0 \end{bmatrix}$

The electromagnetic field tensor in coordinate system K is $F = F^{ij}$.

By **(N11)** and **(N12)** we get

(INV 10)

$$F^{ij} = (\partial w^i / \partial w'^k \times_n \partial w^j / \partial w'^l) \times_n F'^{kl} +_n \Omega_2'^{ij}$$

where $i, j \in (0, 1, 2, 3)$ and summation is by all $k, l \in (0, 1, 2, 3)$,

and where

$$\Omega_2' = \Omega_2'^{ij} = \begin{bmatrix} \zeta_{92} & \zeta_{93} & \zeta_{94} & \zeta_{95} \\ \zeta_{96} & \zeta_{97} & \zeta_{98} & \zeta_{99} \\ \zeta_{100} & \zeta_{101} & \zeta_{102} & \zeta_{103} \\ \zeta_{104} & \zeta_{105} & \zeta_{106} & \zeta_{107} \end{bmatrix}$$

where $\zeta_{92}, ..., \zeta_{107}$ are random variables depend on n and m.

We assume that all elements of this equality belong to W_n.

So, the probability of equality

(INV 10')

$$F = F^{ij} = (\partial w^i/\partial w'^k \times_n \partial w^j/\partial w'^l) \times_n F'^{kl}$$

is less than 1.

We can write down now

(INV 11)

$$F = F^{ij} = (L_k'^i \times_n L_l'^j) \times_n F'^{kl} +_n \Omega_3'^{ij}$$

where again $i, j \in (0, 1, 2, 3)$ and summation is by all $k, l \in (0, 1, 2, 3)$,

and where

$$\Omega_3' = \Omega_3'^{ij} = \begin{bmatrix} \zeta_{108} & \zeta_{109} & \zeta_{110} & \zeta_{111} \\ \zeta_{112} & \zeta_{113} & \zeta_{114} & \zeta_{115} \\ \zeta_{116} & \zeta_{117} & \zeta_{118} & \zeta_{119} \\ \zeta_{120} & \zeta_{121} & \zeta_{122} & \zeta_{123} \end{bmatrix}$$

where $\zeta_{108}, ..., \zeta_{123}$ are random variables depend on n and m.

We assume that all elements of this equality belong to W_n.

So, the probability of equality

(INV 11')

$$F = F^{ij} = (L_k'^i \times_n L_l'^j) \times_n F'^{kl}$$

is less than 1.

I.e.

(INV 12)

$$F = L' \times_n (F' \times_n L'^T) +_n \Omega_3' = L' \times_n (F' \times_n L') +_n \Omega_3'$$

because

$$L'^T = L'$$

So, the probability of equality

(INV 12')

$$F = L' \times_n (F' \times_n L')$$

is less than 1.

And we get

(INV 13)

$$F = C' +_n \Omega_4'$$

where

$C' =$

$$\begin{bmatrix} 0 & E_x & \gamma \times_n E_y +_n \alpha \times_n H_z & \gamma \times_n E_z -_n \alpha \times_n H_y \\ -E_x & 0 & \alpha \times_n E_y +_n \gamma \times_n H_z & \alpha \times_n E_z -_n \gamma \times_n H_y \\ -\gamma \times_n E_y -_n \alpha \times_n H_z & -\alpha \times_n E_y -_n \gamma \times_n H_z & 0 & H_x \\ -\gamma \times_n E_z +_n \alpha \times_n H_y & -\alpha \times_n E_z +_n \gamma \times_n H_y & -H_x & 0 \end{bmatrix}$$

and

$$\Omega_4' = \Omega_4'^{ij} = \begin{bmatrix} \zeta_{124} & \zeta_{125} & \zeta_{126} & \zeta_{127} \\ \zeta_{128} & \zeta_{129} & \zeta_{130} & \zeta_{131} \\ \zeta_{132} & \zeta_{133} & \zeta_{134} & \zeta_{135} \\ \zeta_{136} & \zeta_{137} & \zeta_{138} & \zeta_{139} \end{bmatrix}$$

where $\zeta_{124}, ..., \zeta_{139}$ are random variables depend on n and m.

We assume that all elements of this equality belong to W_n.

So, the probability of equality

(INV 13')

$F =$

$$\begin{bmatrix} 0 & E_x & \gamma \times_n E_y +_n \alpha \times_n H_z & \gamma \times_n E_z -_n \alpha \times_n H_y \\ -E_x & 0 & \alpha \times_n E_y +_n \gamma \times_n H_z & \alpha \times_n E_z -_n \gamma \times_n H_y \\ -\gamma \times_n E_y -_n \alpha \times_n H_z & -\alpha \times_n E_y -_n \gamma \times_n H_z & 0 & H_x \\ -\gamma \times_n E_z +_n \alpha \times_n H_y & -\alpha \times_n E_z +_n \gamma \times_n H_y & -H_x & 0 \end{bmatrix}$$

is less than 1.

And we get

(INV 14)

$$E_x = E_x' +_n \zeta_{140}$$

$$E_y = \gamma \times_n E_y' +_n \alpha \times_n H_z' +_n \zeta_{141} = \gamma \times_n E_y' +_n (\gamma \times_n \beta) \times_n H_z' +_n \zeta_{141}$$

$$E_z = \gamma \times_n E_z' -_n \alpha \times_n H_y' +_n \zeta_{142} = \gamma \times_n E_z' -_n (\gamma \times_n \beta) \times_n H_y' +_n \zeta_{142}$$

$$H_x = H'_x +_n \zeta_{143}$$

$$H_y = -\alpha \times_n E'_z +_n \gamma \times_n H'_y +_n \zeta_{144} = (-\gamma \times_n \beta) \times_n E'_z +_n \gamma \times_n H'_y +_n \zeta_{144}$$

$$H_z = \alpha \times_n E'_y +_n \gamma \times_n H'_z +_n \zeta_{145} = (\gamma \times_n \beta) \times_n E'_y +_n \gamma \times_n H'_z +_n \zeta_{145}$$

where $\zeta_{140}, ..., \zeta_{145}$ are random variables depend on n and m.
We assume that all elements of these equalities belong to W_n.
So, the probability of equalities
(INV 14')

$$E_x = E'_x$$

$$E_y = \gamma \times_n E'_y +_n \alpha \times_n H'_z = \gamma \times_n E'_y +_n (\gamma \times_n \beta) \times_n H'_z$$

$$E_z = \gamma \times_n E'_z -_n \alpha \times_n H'_y = \gamma \times_n E'_z -_n (\gamma \times_n \beta) \times_n H'_y$$

$$H_x = H'_x$$

$$H_y = -\alpha \times_n E'_z +_n \gamma \times_n H'_y = (-\gamma \times_n \beta) \times_n E'_z +_n \gamma \times_n H'_y$$

$$H_z = \alpha \times_n E'_y +_n \gamma \times_n H'_z = (\gamma \times_n \beta) \times_n E'_y +_n \gamma \times_n H'_z$$

is less than 1.

12.3 Observer's Mathematics Maxwell electrodynamic equations invariance under Simplified Observer's Mathematics Lorentz transformation

As we showed above we can write down Maxwell equations in Observer's Mathematics as the follow:

(M1")

$$\mathbf{rotE} = -\frac{1}{c} \times_n \partial \mathbf{H}/\partial t +_n \xi_{40}$$

(M2')

$$div\mathbf{H} = \xi_{30}$$

(M3')

$$\mathbf{rotH} = \frac{1}{c} \times_n \partial \mathbf{E}/\partial t +_n \frac{4 \times_n \pi}{c} \times_n \mathbf{j} +_n \xi_{42}$$

(M4')

$$div\mathbf{E} = (4 \times_n \pi) \times_n \rho +_n \xi^0_{42}$$

Now we start to investigate the simplified Observer's Mathematics Lorentz transformation invariance of Maxwell equations

Let's start from

(M1")

$$\mathbf{rotE} = -\frac{1}{c} \times_n \partial \mathbf{H}/\partial t +_n \xi_{40}$$

and

(M2')

$$div\mathbf{H} = \xi_{30}$$

Let's take such measurement units where $c = 1$ and corresponding with this condition $v < 1$

In coordinates of system K we get

$$\partial H_x/\partial x +_n \partial H_y/\partial y +_n \partial H_z/\partial z = \xi_{30}$$

Let's see how this equation may be written down in coordinates of system K'.

We get

(INV 15)

$$\partial H'_x/\partial x' = \partial H_x/\partial x' +_n \zeta_{146} = \partial H_x/\partial x \times_n \partial x/\partial x' +_n \partial H_x/\partial t \times_n \partial t/\partial x' +_n \zeta_{147} =$$

$$= \partial H_x/\partial x \times_n \gamma +_n \partial H_x/\partial t \times_n (-\beta \times_n \gamma) +_n \zeta_{148}$$

$$\partial H'_y/\partial y' = \partial((\beta \times_n \gamma) \times_n E_z +_n \gamma \times_n H_y)/\partial y +_n \zeta_{149} = (\beta \times_n \gamma) \times_n \partial E_z/\partial y +_n \gamma \times_n \partial H_y/\partial y +_n \zeta_{150}$$

$$\partial H'_z/\partial z' = \partial(-(\beta \times_n \gamma) \times_n E_y +_n \gamma \times_n H_z)/\partial z +_n \zeta_{151} = -(\beta \times_n \gamma) \times_n \partial E_y/\partial z +_n \gamma \times_n \partial H_z/\partial z +_n \zeta_{152}$$

And

(INV 16)

$$\partial H'_x/\partial x' +_n \partial H'_y/\partial y' +_n \partial H'_z/\partial z' = \gamma \times_n (\partial H_x/\partial x +_n \partial H_y/\partial y +_n \partial H_z/\partial z) +_n \zeta_{153} +_n$$

$$+_n (\beta \times_n \gamma) \times_n (-\partial H_x/\partial t +_n \partial E_z/\partial y -_n \partial E_y/\partial z) +_n \zeta_{154} +_n \zeta_{155}$$

where $\zeta_{147}, ..., \zeta_{154}$ are random variables depend on n and m.

We assume that all elements of this equality belong to W_n.

So, by **(M1")** and **(M2')** we get

(INV 17)

$$\partial H'_x/\partial x' +_n \partial H'_y/\partial y' +_n \partial H'_z/\partial z' = \gamma \times_n \xi_{30} +_n (\beta \times_n \gamma) \times_n \xi^1_{40} +_n \zeta_{153} +_n \zeta_{154} +_n \zeta_{155} =$$

$$= \zeta_{156}$$

where ζ_{155}, ζ_{156} are random variables depend on n and m.

We assume that all elements of this equality belong to W_n.

So, we proved

THEOREM 12.1. *Maxwell equation **(M2')** is invariance under simplified Observer's Mathematics Lorentz transformation, i.e. has the same expression in coordinate system K and in coordinate system K', but difference is only in random variables ξ_{30} and ζ_{156} having different distribution functions.*

By **(M1")** we get

(M1"')

$$\partial E_z/\partial y -_n \partial E_y/\partial z +_n \partial H_x/\partial t = \xi^1_{40}$$

$$\partial E_x/\partial z -_n \partial E_z/\partial x +_n \partial H_y/\partial t = \xi^2_{40}$$

$$\partial E_y/\partial x -_n \partial E_x/\partial y +_n \partial H_z/\partial t = \xi^3_{40}$$

We get

(INV 18)

$$\xi_{40}^1 = \partial E_z/\partial y -_n \partial E_y/\partial z +_n \partial H_x/\partial t =$$

$$= \partial(\gamma \times_n E'_z -_n (\gamma \times_n \beta) \times_n H'_y)/\partial y' -_n \partial(\gamma \times_n E'_y +_n (\gamma \times_n \beta) \times_n H'_z)/\partial z' +_n$$

$$+_n \partial H'_x/\partial t' \times_n \partial t'/\partial t +_n \partial H'_x/\partial x' \times_n \partial x'/\partial t +_n \zeta_{157} =$$

$$= \gamma \times_n \partial E'_z/\partial y' -_n (\gamma \times_n \beta) \times_n \partial H'_y/\partial y' -_n \gamma \times_n \partial E'_y/\partial z' -_n (\gamma \times_n \beta) \times_n \partial H'_z/\partial z' +_n$$

$$+_n \partial H'_x/\partial t' \times_n \gamma +_n \partial H'_x/\partial x' \times_n (-\beta \times_n \gamma) +_n \zeta_{157} +_n \zeta_{158} =$$

$$= \gamma \times_n (\partial E'_z/\partial y' -_n \partial E'_y/\partial z' +_n \partial H'_x/\partial t') -_n (\gamma \times_n \beta) \times_n (\partial H'_y/\partial y' +_n \partial H'_z/\partial z' +_n \partial H'_x/\partial x') +_n \zeta_{157} +_n \zeta_{158} =$$

$$= \gamma \times_n (\partial E'_z/\partial y' -_n \partial E'_y/\partial z' +_n \partial H'_x/\partial t') +_n (\gamma \times_n \beta) \times_n \zeta_{156} +_n \zeta_{157} +_n \zeta_{158}$$

I.e.

(INV 19)

$$\partial E'_z/\partial y' -_n \partial E'_y/\partial z' +_n \partial H'_x/\partial t' = \zeta_{159}^1$$

where $\zeta_{157}, \zeta_{158}, \zeta_{159}^1$ are random variables depend on n and m.

We assume that all elements of this equality belong to W_n.

Let's take second equation from **(M1"')**

(INV 20)

$$\xi_{40}^2 = \partial E_x/\partial z -_n \partial E_z/\partial x +_n \partial H_y/\partial t =$$

$$= \partial E'_x/\partial z' -_n \partial(\gamma \times_n E'_z -_n (\gamma \times_n \beta) \times_n H'_y)/\partial t' \times_n \partial t'/\partial x -_n \partial(\gamma \times_n E'_z -_n (\gamma \times_n \beta) \times_n H'_y)/\partial x' \times_n \partial x'/\partial x +_n$$

$$+_n \partial((-\gamma \times_n \beta) \times_n E'_z +_n \gamma \times_n H'_y)/\partial t' \times_n \partial t'/\partial t +_n \partial((-\gamma \times_n \beta) \times_n E'_z +_n \gamma \times_n H'_y)/\partial x' \times_n \partial x'/\partial t +_n \zeta_{160} =$$

$$= \partial E'_x/\partial z' -_n (\gamma \times_n (-\gamma \times_n \beta)) \times_n \partial E'_z/\partial t' -_n (\gamma \times_n \beta) \times_n (\gamma \times_n \beta) \times_n \partial H'_y/\partial t' -_n$$

$$-_n(\gamma \times_n \gamma) \times_n \partial E'_z/\partial x' +_n ((\gamma \times_n \beta) \times_n \gamma) \times_n \partial H'_y/\partial x' +_n$$

$$+_n((-\gamma \times_n \beta) \times_n \gamma) \times_n \partial E'_z/\partial t' +_n (\gamma \times_n \gamma) \times_n \partial H'_y/\partial t' +_n$$

$$+_n((-\gamma \times_n \beta) \times_n (-\beta \times_n \gamma)) \times_n \partial E'_z/\partial x' +_n (\gamma \times_n (-\beta \times_n \gamma)) \times_n \partial H'_y/\partial x' +_n \zeta_{161} =$$

$$= \partial E'_x/\partial z' -_n \partial E'_z/\partial x' +_n \partial H'_y/\partial t' +_n \zeta_{162}$$

I.e.

(INV 21)

$$\partial E'_x/\partial z' -_n \partial E'_z/\partial x' +_n \partial H'_y/\partial t' = \zeta^2_{159}$$

where $\zeta_{160}, \zeta_{161}, \zeta_{162}, \zeta^2_{159}$ are random variables depend on n and m.

We assume that all elements of this equality belong to W_n.

Let's take third equation from **(M1"')**

(INV 22)

$$\xi^3_{40} = \partial E_y/\partial x -_n \partial E_x/\partial y +_n \partial H_z/\partial t =$$

$$= \partial(\gamma \times_n E'_y +_n (\gamma \times_n \beta) \times_n H'_z)/\partial t' \times_n \partial t'/\partial x +_n \partial(\gamma \times_n E'_y +_n (\gamma \times_n \beta) \times_n H'_z)/\partial x' \times_n \partial x'/\partial x -_n \partial E'_x/\partial y' +_n$$

$$+_n \partial((\gamma \times_n \beta) \times_n E'_y +_n \gamma \times_n H'_z)/\partial t' \times_n \partial t'/\partial t +_n \partial((\gamma \times_n \beta) \times_n E'_y +_n \gamma \times_n H'_z)/\partial x' \times_n \partial x'/\partial t +_n \zeta_{163} =$$

$$= (\gamma \times_n (-\beta \times_n \gamma)) \times_n \partial E'_y/\partial t' -_n ((\gamma \times_n \beta) \times_n (\gamma \times_n \beta)) \times_n \partial H'_z/\partial t' +_n$$

$$+_n(\gamma \times_n \gamma) \times_n \partial E'_y/\partial x' +_n ((\gamma \times_n \beta) \times_n \gamma) \times_n \partial H'_z/\partial x' -_n \partial E'_x/\partial y' +_n ((\gamma \times_n \beta) \times_n \gamma) \times_n \partial E'_y/\partial t' +_n$$

$$+_n(\gamma \times_n \gamma) \times_n \partial H'_z/\partial t' +_n ((\gamma \times_n \beta) \times_n (-\gamma \times_n \beta)) \times_n \partial E'_y/\partial x' +_n (\gamma \times_n (-\gamma \times_n \beta)) \partial H'_z/\partial x' +_n \zeta_{164} =$$

$$= \partial E'_y/\partial x' -_n \partial E'_x/\partial y' +_n \partial H'_z/\partial t' +_n \zeta_{165}$$

I.e.

(INV 23)

$$\partial E'_y/\partial x' -_n \partial E'_x/\partial y' +_n \partial H'_z/\partial t' = \zeta^3_{159}$$

where $\zeta_{163}, \zeta_{164}, \zeta_{165}, \zeta^3_{159}$ are random variables depend on n and m.

We assume that all elements of this equality belong to W_n.

So, we proved the following

THEOREM 12.2. *Maxwell equation* ***(M1")*** *is invariance under simplified Observer's Mathematics Lorentz transformation, i.e. has the same expression in coordinate system K and in coordinate system K', but difference is only in random vectors ξ_{30} and ζ_{159} having different distribution functions.*

Let's go now to the second pair of Maxwell equations

(M3')

$$\mathbf{rotH} = \frac{1}{c} \times_n \partial \mathbf{E}/\partial t +_n \frac{4 \times_n \pi}{c} \times_n \mathbf{j} +_n \xi_{42}$$

and

(M4')

$$div\mathbf{E} = (4 \times_n \pi) \times_n \rho +_n \xi_{62}$$

and investigate the simplified Observer's Mathematics Lorentz transformation invariance of these equations.

We can assume that

$$\rho = 0, \mathbf{j} = \mathbf{0}$$

In this case we can rewrite

(M3")

$$\mathbf{rotH} = \frac{1}{c} \times_n \partial \mathbf{E}/\partial t +_n \xi_{42}$$

and

(M4")

$$div\mathbf{E} = \xi_{62}$$

And again let's take such measurement units where $c = 1$ and corresponding with this condition $v < 1$.

In coordinates of system K we get

$$\partial E_x/\partial x +_n \partial E_y/\partial y +_n \partial E_z/\partial z = \xi_{62}$$

Let's see how this equation may be written down in coordinates of system K'.

We get

(INV 24)

$$\partial E'_x/\partial x' = \partial E_x/\partial x \times_n \partial x/\partial x' +_n \partial E_x/\partial t \times_n \partial t/\partial x' +_n \zeta_{166} =$$

$$= \gamma \times_n \partial E_x/\partial x +_n (\beta \times_n \gamma) \times_n \partial E_x/\partial t +_n \zeta_{167}$$

$$\partial E'_y/\partial y' = \partial(\gamma \times_n E_y -_n (\gamma \times_n \beta) \times_n H_z)/\partial y +_n \zeta_{168} =$$

$$= \gamma \times_n \partial E_y/\partial y -_n (\gamma \times_n \beta)\partial H_z/\partial y +_n \zeta_{169}$$

$$\partial E'_z/\partial z' = \partial(\gamma \times_n E_z +_n (\gamma \times_n \beta) \times_n H_y)/\partial z +_n \zeta_{170} =$$

$$= \gamma \times_n \partial E_z/\partial z +_n (\gamma \times_n \beta) \times_n \partial H_y/\partial z +_n \zeta_{171}$$

And

(INV 25)

$$\partial E'_x/\partial x' +_n \partial E'_y/\partial y' +_n \partial E'_z/\partial z' = \gamma \times_n \partial E_x/\partial x +_n (\beta \times_n \gamma) \times_n \partial E_x/\partial t +_n \zeta_{167} +_n$$

$$+_n \gamma \times_n \partial E_y/\partial y -_n (\gamma \times_n \beta)\partial H_z/\partial y +_n \zeta_{169} +_n \gamma \times_n \partial E_z/\partial z +_n (\gamma \times_n \beta) \times_n \partial H_y/\partial z +_n \zeta_{171} =$$

$$= \gamma \times_n (\partial E_x/\partial x +_n \partial E_y/\partial y +_n \partial E_z/\partial z) +_n (\gamma \times_n \beta) \times_n (\partial H_y/\partial z -_n \partial H_z/\partial y +_n \partial E_x/\partial t) +_n \zeta_{172} =$$

$$= \gamma \times_n \xi_{62} +_n (\gamma \times_n \beta) \times_n \xi_{42} +_n \zeta_{172}$$

I.e.

(INV 26)

$$\partial E'_x/\partial x' +_n \partial E'_y/\partial y' +_n \partial E'_z/\partial z' = \zeta_{173}$$

where $\zeta_{166}, \zeta_{167}, \zeta_{168}, \zeta_{169}, \zeta_{170}, \zeta_{171}, \zeta_{172}, \zeta_{173}$ are random variables depend on n and m.

We assume that all elements of this equality belong to W_n.

So, we proved the following

Theorem 12.3. *Maxwell equation* ***(M4")*** *is invariance under simplified Observer's Mathematics Lorentz transformation, i.e. has the same expression in coordinate system K and in coordinate system K', but difference is only in random vectors ξ_{62} and ζ_{173} having different distribution functions.*

In coordinates of system K and by **(M3")** we get

(M3"')

$$\partial H_z/\partial y -_n \partial H_y/\partial z -_n \partial E_x/\partial t = \xi_{42}^1$$

$$\partial H_x/\partial z -_n \partial H_z/\partial x -_n \partial E_y/\partial t = \xi_{42}^2$$

$$\partial H_y/\partial x -_n \partial H_x/\partial y -_n \partial E_z/\partial t = \xi_{42}^3$$

Let's see how these equations may be written down in coordinates of system K'.

We get

(INV 27)

$$\xi_{42}^1 = \partial H_z/\partial y -_n \partial H_y/\partial z -_n \partial E_x/\partial t =$$

$$= \partial((\gamma \times_n \beta) \times_n E'_y +_n \gamma \times_n H'_z)/\partial y' -_n \partial((-\gamma \times_n \beta) \times_n E'_z +_n \gamma \times_n H'_y)/\partial z' -_n$$

$$-_n \partial E'_x/\partial t +_n \zeta_{174} =$$

$$= (\gamma \times_n \beta) \times_n \partial E'_y/\partial y' +_n \gamma \times_n \partial H'_z/\partial y' +_n (\gamma \times_n \beta) \times_n \partial E'_z/\partial z' -_n \gamma \times_n \partial H'_y/\partial z' -_n$$

$$-_n \partial E'_x/\partial t' \times_n \partial t'/\partial t -_n \partial E'_x/\partial x' \times_n \partial x'/\partial t +_n \zeta_{175} =$$

$$= (\gamma \times_n \beta) \times_n \partial E'_y/\partial y' +_n \gamma \times_n \partial H'_z/\partial y' +_n (\gamma \times_n \beta) \times_n \partial E'_z/\partial z' -_n \gamma \times_n \partial H'_y/\partial z' -_n$$

$$-_n \gamma \times_n \partial E'_x/\partial t' -_n (-\gamma \times_n \beta) \times_n \partial E'_x/\partial x' +_n \zeta_{176} =$$

$$= (\gamma \times_n \beta) \times_n (\partial E'_x/\partial x' +_n \partial E'_y/\partial y' +_n \partial E'_z/\partial z') +_n \gamma \times_n (\partial H'_z/\partial y' -_n \partial H'_y/\partial z' -_n \partial E'_x/\partial t') +_n \zeta_{177} =$$

$$= \gamma \times_n \beta) \times_n \zeta_{173} +_n \gamma \times_n (\partial H'_z/\partial y' -_n \partial H'_y/\partial z' -_n \partial E'_x/\partial t') +_n \zeta_{177}$$

I.e.

(INV 28)

$$\partial H'_z/\partial y' -_n \partial H'_y/\partial z' -_n \partial E'_x/\partial t' = \zeta^1_{178}$$

where $\zeta_{174}, \zeta_{175}, \zeta_{176}, \zeta_{177}, \zeta^1_{178}$ are random variables depend on n and m.

We assume that all elements of this equality belong to W_n.

Let's take second equation from **(M3"')**

(INV 29)

$$\xi^2_{42} = \partial H_x/\partial z -_n \partial H_z/\partial x -_n \partial E_y/\partial t =$$

$$= \partial H'_x/\partial z' -_n \partial((\gamma \times_n \beta) \times_n E'_y +_n \gamma \times_n H'_z)/\partial t' \times_n \partial t'/\partial x -_n \partial((\gamma \times_n \beta) \times_n E'_y +_n \gamma \times_n H'_z)/\partial x' \times_n \partial x'/\partial x -_n$$

$$-_n \partial(\gamma \times_n E'_y +_n (\gamma \times_n \beta) \times_n H'_z)/\partial t' \times_n \partial t'/\partial t -_n \partial(\gamma \times_n E'_y +_n (\gamma \times_n \beta) \times_n H'_z)/\partial x' \times_n \partial x'/\partial t +_n \zeta_{179} =$$

$$= \partial H'_x/\partial z' -_n ((\gamma \times_n \beta) \times_n (-\gamma \times_n \beta)) \times_n \partial E'_y/\partial t' +_n ((\gamma \times_n \beta) \times_n (\gamma)) \times_n \partial H'_z/\partial t' -_n$$

$$-_n ((\gamma \times_n \beta) \times_n (\gamma)) \times_n \partial E'_y/\partial x' -_n (\gamma \times_n \gamma) \times_n \partial H'_z/\partial x') -_n$$

$$-_n (\gamma \times_n \gamma) \times_n \partial E'_y/\partial t' -_n ((\gamma \times_n \beta) \times_n (\gamma)) \times_n \partial H'_z/\partial t' +_n$$

$$+_n ((\gamma \times_n \beta) \times_n \gamma) \times_n \partial E'_y/\partial x' +_n ((\gamma \times_n \beta) \times_n (\gamma \times_n \beta)) \times_n \partial H'_z/\partial x' +_n \zeta_{180} =$$

$$= \partial H'_x/\partial z' -_n \partial H'_z/\partial x' -_n \partial E'_y/\partial t' +_n \zeta_{180}$$

I.e.

(INV 30)

$$\partial H'_x/\partial z' -_n \partial H'_z/\partial x' -_n \partial E'_y/\partial t' = \zeta^2_{178}$$

where $\zeta_{179}, \zeta_{180}, \zeta^2_{178}$ are random variables depend on n and m.

We assume that all elements of this equality belong to W_n.

Let's take third equation from **(M3"')**

(INV 31)

$$\xi_{42}^3 = \partial H_y/\partial x -_n \partial H_x/\partial y -_n \partial E_z/\partial t =$$

$$= \partial((-\gamma \times_n \beta) \times_n E'_z +_n \gamma \times_n H'_y)/\partial t' \times_n \partial t'/\partial x +_n \partial((-\gamma \times_n \beta) \times_n E'_z +_n \gamma \times_n H'_y)/\partial x' \times_n \partial x'/\partial x -_n$$

$$-_n \partial H'_x/\partial y' -_n \partial(\gamma \times_n E'_z -_n (\gamma \times_n \beta) \times_n H'_y)/\partial t' \times_n \partial t'/\partial t -_n \partial(\gamma \times_n E'_z -_n (\gamma \times_n \beta) \times_n H'_y)/\partial x' \times_n \partial x'/\partial t +_n$$

$$+_n \zeta_{181} = ((-\gamma \times_n \beta) \times_n (-\gamma \times_n \beta)) \times_n \partial E'_z/\partial t' +_n (\gamma \times_n (-\gamma \times_n \beta)) \times_n \partial H'_y/\partial t' +_n$$

$$+_n (\gamma \times_n (-\gamma \times_n \beta)) \times_n \partial E'_z/\partial x' +_n (\gamma \times_n \gamma) \times_n \partial H'_y/\partial x' -_n \partial H'_x/\partial y' -_n$$

$$-_n (\gamma \times_n \gamma) \times_n \partial E'_z/\partial t' +_n ((\gamma \times_n (\gamma \times_n \beta)) \times_n \partial H'_y/\partial t' +_n$$

$$+_n ((\gamma \times_n (\gamma \times_n \beta)) \times_n \partial E'_z/\partial x' -_n ((\gamma \times_n \beta) \times_n (\gamma \times_n \beta)) \times_n \partial H'_y/\partial x' +_n \zeta_{182} =$$

$$= \partial H'_y/\partial x' -_n \partial H'_x/\partial y' -_n \partial E'_z/\partial t' +_n \zeta_{183}$$

I.e.

(INV 32)

$$\partial H'_y/\partial x' -_n \partial H'_x/\partial y' -_n \partial E'_z/\partial t' = \zeta_{178}^3$$

where $\zeta_{181}, \zeta_{182}, \zeta_{183}, \zeta_{178}^3$ are random variables depend on n and m.

We assume that all elements of this equality belong to W_n.

So, we proved the following

THEOREM 12.4. *Maxwell equation **(M3")** is invariance under simplified Observer's Mathematics Lorentz transformation, i.e. has the same expression in coordinate system K and in coordinate system K', but difference is only in random vectors $\xi_{42} = (\xi_{42}^1, \xi_{42}^2, \xi_{42}^3)$ and $\zeta_{178} = (\zeta_{178}^1, \zeta_{178}^2, \zeta_{178}^3)$ having different distribution functions.*