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Absolute. Main principles

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Abstract

In this article it is proved what it is not necessary to identify the Universe with Minkowski space in condition of consideration of inertial frames of reference (IRF), all events can be described in Euclidean space; for this purpose the method of synchronization not dependent on speed of light is offered; transformations of coordinates between IRFs in the Absolute space are deduced; it is shown, that the Relativity Principle for movement is a result of shift of clock indications; the set of IRFs with constant speed of light and Lorentz's transformations is constructed.

Contents

1. Introduction

One of the major attributes of simplicity of the physical theory is its presentation. In particular, it concerns to geometry of space. But what is known about it? Is it a geometry of Euclidean space or Minkowski space? Rosental asks a question: "Whether the physical geometry is unique?", specifying sense of Poincare statement: "Experience does not determine separately physics and geometry", and answers: "There is, apparently, a unique geometry (or, more precisely, the limited class of geometries), relevant to a full set of experiments."[1,part 4]

I offer different formulation of the answer to this question: The geometry of the Universe is unique, as it does not depend on conditions in which there is an observer, but the picture observable by him depends on objective and subjective conditions, in particular, on postulates (which are used, for example, for definition of light's standards of time and length). Thus, the observable geometry of the Universe has in itself an element of subjectivity.

In this article the proof is given that a uniform rectilinear movement of bodies and frames of reference can be described in 4-dimensional linear (Euclidean) space. For this purpose in the Preferred frame of reference of motionless isotropic Euclidean space (Absolute) the method of synchronization of clock not dependent on speed of light is offered; transformations of coordinates between inertial frames of reference in Absolute space are deduced; for inertial frames of reference (IRFs) a form-invariance of all laws of physics (but not in sense of a postulate of Einstein) is proved; other set of IRFs is constructed, in which coordinates of any event are related by Lorentz's transformations, speed of light in them is constant, and the principle of a relativity for a space-time relations is executed; is shown, that the Principle of a relativity for movement is obtained from shift of clock's indications. Then the conclusion about an opportunity of the description of events in Absolute is generalized up-to non-inertial movements.

Thus, Minkowski space is constructed in Absolute, physical relation (shift of clock's indications) of these spaces is shown. All events described in 4-dimensional Minkowski space (that is, within the Special relativity theory (SRT)) are described and in initial (3+1)-dimensional linear space (Absolute) in which in everyone IRF its time is set by its speed of movement, and its 3-dimensional metric space remains Euclidean. Thus, the Lorentz’s transformations are executed in Absolute under certain conditions.

Hence, the physical and mathematical description of processes and space geometries can be various. However I believe, that the answer to a question on the physical reason which forces a rate of time of a clock's ticks to depend on speed of clock's moving, shall give preference to Absolute.

Internal consistency of the offered theory is obtained from internal consistency SRT and from fact that the Lorentz's transformations (as a part SRT) are deduced from postulates of the offered theory. The second postulate of the new theory is the null result of the Michelson-Morley experiment (MME). The first postulate is a basic condition of Maxwell theory (this theory also is used in SRT). Properties of IRFs do not contradict Einstein's definition of IRF. The method of natural synchronization (MSN) is only physical action, that is, cannot contradict any physical theory.

It would be desirable, that this theory which has bound model Absolute and model SRT, became the uniting idea, which would be destroying a division of physicists on supporters and opponents of the relativity theory.

2. Space, time, clock, synchronization

So, we shall consider direct multiplication of *three-dimensional Euclidean (linear) space* $R^3=\{x,y,z\}$ and *one-dimensional time* $T=R^1=\{t\}$. Such multiplication is equivalent to four-dimensional *Euclidean vector* space $R^4=\{t,x,y,z\}$. R^4 is called *the world space*.

A frame of reference is the point named an origin (*Zero point*), and 4 linearly independent unity vectors, enclosed to this point, with help of which it is possible to determine unambiguously coordinates of any point of space R^4.

The space R^3 we shall count *motionless*. In R^3 it is possible to choose rectangular Cartesian system of coordinates with function of distance between two points $d^2=(x_2-x_1)^2+(y_2-y_1)^2+(z_2-z_1)^2$. Having added to this system any vector with nonzero value t, we shall obtain in R^4 a frame of reference in which all points of space R^3 do not change the coordinates during the time. Such reference frame (RF) we shall name *absolutely motionless* or *absolutely* (ARF), and space R^4 - *absolute space* or *Absolute*. Coordinates of any point in ARF refer to as *absolute coordinates*. Absolute coordinates of any point are determined unambiguously.

Here properties are executed: *uniformity* of space and time, i.e. independence of properties of space R^3 and time T from a choice of an origin point (the beginning of coordinates R^3 and Zero point of time); *an isotropy* of space R^3, i.e. all spatial directions are equal in rights.

In R^3 a change of linear coordinates of a point during the time refers to as its *movement*. For two positions (x_1, y_1, z_1) and (x_2, y_2, z_2) of any point in R^3 on a trajectory of its movement in the corresponding moments of time t_1 and t_2, *a chord speed* of movement of this point in ARF we shall name three-dimensional vector $\boldsymbol{v}=(v_X,v_Y,v_Z)$; where $v_K=(K_2-K_1)/(t_2-t_1)$; K=x,y,z; the direction of the chord speed is set by a direction of these positions. For uniform rectilinear movement a chord speed of movement of a point will be a constant for all sites of a trajectory, therefore we shall name it simply - *speed* of movement. A chord speed of movement of any point in ARF refers to as *absolute chord speed*.

A system, Zero point of which moves in ARF with constant speed v, and a basic vectors do not change in ARF its length and direction, we name *an inertial reference frame*. Coordinates of points in IRF refer to as *relative coordinates*, movement of points in IRF refers to as *relative movement*. It is obvious, that so defined IRF possess properties: anyone IRF_1, determined in anyone IRF_2, is inertial reference frame in ARF; anyone IRF_1, determined in ARF, is inertial reference frame in anyone IRF_2. A chord speed of movement of any point in IRF refers to as *relative chord speed.*

A set of all events ranked on coordinate t, bound to given object is named *process*. Process is named *cyclic* if in this set there are the repeating values of some characteristics of this process (for example, angular position of a drying water drop fallen on a rotating wood lark). Quantity of cycles of some cyclic process occurring in the same place (for example, longevity of a drop on wood lark can make 2.5 revolutions of the wood lark) is named *duration* of process.

Thus, for unequivocal definition of duration of any processes in any points of space it is necessary to have one standard cyclic process equally performing in each point. Uniformly determined quantity of cycles in each point IRF is named *a time interval*. (Exactly so at measurement of the sizes of a body we count amount of identical length's units laid between any points of a body.) Time interval between two events in different IRF can be miscellaneous, despite of use of identical cyclic processes. The device for counting amount of cycles is named *a clock*. Thus, the *time* is necessary concept neither in physics, nor in mathematics, nor in the Nature. *Time* is simply the name of one of dimensions in R^4. Measurement of this size is a duration of the necessary amount of standard cycles.

Measurement of the size of a figure moving in IRF, demands a use of several clocks, and consequently without additional procedure of synchronization of clock in IRF (that is, installation of the simultaneous moments of reference marks of clocks) clocks are not capable to mark a coincidence of events in the time correctly. In anyone IRF only two methods of synchronization of the clock spaced apart were considered possible recently:

- With the help of signaling between two clocks or from the third source (MSS -

Einstein's method); this method demands presence of isotropic speed of a signal.
- Moving the third clock between two synchronized clocks (MSM); this method is efficient and workable in SRT, that is, for IRF with isotropic speed of light, but at anisotropic speed of light there is an example of transformations of coordinates when this method is not workable. (see part 6.)

However the method of synchronization of clocks in one IRF on the clocks from another IRF is possible also. We shall consider *a natural method of synchronization* (MSN), according to which a synchronization of clocks in IRF is executed on simultaneous events in ARF. We believe, that in ARF all motionless clocks are synchronized at any moment t. (It is possible because of isotropic properties of space and time in ARF, in particular, speed limit of distribution of interaction should be isotropic; and it is necessary, as otherwise in ARF it is impossible to measure length of a moving object.) Let all clocks in all points of ARF simultaneously at moment T=0 carry out some alarm action, hence, in any point of IRF at some moment this action will take place, and it becomes a reference mark of time T'=0 in the given point. This method does not depend on speeds of signals in IRF, their isotropy or anisotropy, and it is based on immediate comparison of clock's indications, therefore it is exact. Consequence from MSN : simultaneous events in one IRF are simultaneous in any other IRF (*an absolute simultaneity*).

3. Transformations of coordinates between IRFs

Model of IRF is a three-dimensional set of points, motionless relatively each other, with identical clock per each point. Axis X' of IRF is parallel to velocity of the IRF in ARF; axis Y' of IRF is perpendicular to axis X' and it lay in plane Y0X of ARF; axis Z' of IRF is perpendicular to axes X' and Y'. One-dimensional analogue of IRF is an infinite ruler which is moving in ARF with constant speed along axis X, with identical clock per each point.

Def: Two IRFs are considered *identical* if any event in them has identical coordinates, otherwise these IRFs are different.

We designate M as a set of all possible IRFs J (with the axes as defined in the above-stated model of IRF, and with conterminous beginnings of coordinates) in absolute space. We shall show, that the set M is more wide, than a set of IRFs with constant speed of light "c" (M_L). "c" (M_L). It is known, that in the theory Galilee there are IRFs K with the speed of light distinguishing from "c". In such IRF K we shall consider 2 events: a start and finish of one light's wave. If even in one IRF I from M_L these 2 events have the same coordinates, then light's speed in IRF I will not be equal "*c*". Hence, IRF *K* does not coincide with anyone IRF from M_L , that is, IRF *K* belongs to set M, but does not belong M_L.

Let's designate M_G as a set of IRFs from M within which a transformation Galilee (G) is executed. From SRT it is known, that any pair IRFs from M_L is bound among themselves by Lorentz's transformation (L). Therefore set M can be divided into subsets on kinds of matrixes of transformation of coordinates: M_G, M_L etc.

In any theory dealing with transformations of coordinates between IRF, it is possible to choose some IRF *J*, and for it to construct linear transformation of coordinates in any IRF *J′* which is moving in *J* with a speed *v′*. By virtue of a continuity *v′* coefficients of transformations can be expressed as functions from *v′*, and by virtue of linearity of transformations it is possible to construct a matrix A(*v′*) with them, that is, it is possible to write down a relation:

$$\boldsymbol{J'}=\boldsymbol{J}*\mathrm{A}(v'), \qquad (1)$$

it means that vector of coordinates ***J′*** of some event in *J′* are obtained, if to transform vector of coordinates ***J*** of the same event in *J* by matrix A(*v′*). And for transformation of coordinates from IRF *J′* into IRF *J″* matrix B() should depend generally on speeds *v′* and *v″* these IRFs in *J*:

$$\mathrm{B}(v',v'')= \mathrm{A}^{-1}(v')\mathrm{A}(v'') \qquad (2)$$

Therefore in any theory there is transformation B(), is allowing to count coordinates of any event for any pair IRFs. Generally these transformations B() depend on two parameters. Matrix A() is a special case of matrix B(): A(*v*)=B(0,*v*). To matrix A() there corresponds a set of IRFs M_A.

For example, in SRT the matrix L of Lorentz transformations is used for transformation of coordinates from some chosen IRF *I* in IRF *I′*. The set M_L of IRFs corresponds to matrix L. For a vector *v′* of speed of IRF *I′* in IRF *I* (parallel to axes X), it is possible to write down the relation: $\boldsymbol{I'}=\boldsymbol{I}*\mathrm{L}(v')$. it means that vector of coordinates of some event in I' are obtained, if to transform coordinates of the same event in *I* by matrix L(*v′*). All IRFs from M_L should satisfy to postulates of SRT, and the matrix of transformation from IRF *I′* in IRF *I″* should depend only on relative speed *v* of IRF *I″* in *I′*: $\mathrm{L}(v)= \mathrm{L}^{-1}(v')*\mathrm{L}(v'')$.

4. Properties of coordinates transformations

From the theory of vector spaces it is known that transition of coordinates ARF *J* *t*,*x*,*y*,*z* into coordinates *t′*,*x′*,*y′*,*z′* IRF *J′* is described by linear transformation, as it is transformation of coordinates for two bases (with the common point zero) in vector space R^4:

$$\begin{aligned} t' &= a_{tt}(v')t + a_{tx}(v')x + a_{ty}(v')y + a_{tz}(v')z \\ x' &= a_{xt}(v')t + a_{xx}(v')x + a_{xy}(v')y + a_{xz}(v')z \\ y' &= a_{yt}(v')t + a_{yx}(v')x + a_{yy}(v')y + a_{xz}(v')z \\ z' &= a_{zt}(v')t + a_{zx}(v')x + a_{zy}(v')y + a_{zz}(v')z \end{aligned} \qquad (3)$$

where factors $a_{ij}(v')$ do not depend on values of coordinates t,x,y,z any points in ARF and coordinates t',x',y',z' this point in system J'. Obvious dependence system $a_{ij}(v')$ from a vector of absolute speed v' of movement J' in ARF is shown here as this dependence can be present and it is necessary for its revealing. For a given speed v' values of factors $a_{ij}(v')$ are constant, and by virtue of a continuity of v' all factors $a_{ij}(v')$ are some continuous functions.

Let A(v') is a matrix of a transformation of vector of coordinates ARF $\boldsymbol{J}=(t,x,y,z)$ in coordinates of J'. Then the linear transformation (3) can be written down as:

$$(t',x',y',z')=(t,x,y,z)\ A(v') \qquad (4)$$

As and ARF and system J' are bases of space R^4 then there is an inverse transformation from system J' in ARF. As a consecutive application of direct and inverse transformations translates coordinates ARF (t,x,y,z) into itself, i.e. multiplication of matrixes of such transformations is an unity matrix, the determinant det(A(v')) is not equal to zero for any speed v', and the matrix of back transformation of coordinates is inverse matrix $A^{-1}(v')$. Note, that in an inverse matrix there is a dependence on direct speed.

If speed v' of IRF J' in ARF J is not parallel to axis X, then there is a turn P of axes making axes X ARF and IRF parallel to v'. Note, that a turn of axes ARF does not change size of a vector v'. If a new coordinates $\boldsymbol{J'}$*P in the rotated IRF are bound to old coordinates J*P in rotated ARF with help of matrix A(v'): $\boldsymbol{J'}*P=\boldsymbol{J}*P*A(v')$, then dependence of old coordinates $\boldsymbol{J'}$ and $\boldsymbol{J}$ is expressed by the formula:

$$\boldsymbol{J'}=\boldsymbol{J}*P*A(v')*P^{-1} \qquad (5)$$

Therefore further for definition of matrix A(v') we shall be limited to consideration only subsets M_A of such frames of reference J' from set M of IRF, for which their speed in ARF are parallel to a direction of their axes X. The vector of speed can be directed and in a negative direction of axis X of ARF. Notice, that at $v'=0$ we obtain a transformation of coordinates from ARF into ARF, , and by virtue of uniqueness of frame of reference should be $a_{tt}(0)= a_{xx}(0)= a_{yy}(0)=a_{zz}(0)=1$, $a_{xy}(0)=a_{yx}(0)=a_{xt}(0)=a_{tx}(0)=a_{yt}(0)=a_{ty}(0)= a_{xz}(0)=a_{zx}(0)=a_{tz}(0)= a_{zt}(0)=a_{yz}(0)=a_{zy}(0)=0$. That is, A(0) =E is an unity matrix.

As origins of IRF and ARF coincide, then axes X', Y', Z' of IRF J' at the moment of time t'=0 coincide with corresponding axes X, Y, Z of ARF at the moment of time t=0.

The presence of any point in ARF on axis Y at the moment of time t=0 means, that its coordinates is given by $(0,0,y,0)$, and on axis Z - $(0,0,0,z)$. Similar property is true for J': the presence of an any point on axis Y' at the moment of time t'=0 means, that its coordinates is given by $(0,0,y',0)$, and on axis Z ' - $0,0,0,z'$). As for IRF J' the point $(0,0,y',0)$ corresponds to some point in ARF with coordinates $(0,0,y,0)$ by virtue of concurrence of axes at $t=t'=0$, a point $(0,0,0,z')$ - to a point $(0,0,0,z)$, and to a point $(t',x',0,0)$ - a point $(0,x,0,0)$, then, having taken $y>0$ and having substituted values of coordinates in (3), we shall obtain: $0=a_{ty}(v')y$; $0=a_{xy}(v')y$; $y'=a_{yy}(v')y$; $0=a_{zy}(v')y$; whence $a_{ty}(v')=a_{xy}(v')=a_{zy}(v')=0$. Having taken $z>0$ and having substituted values of coordinates in (3), we shall obtain: $0=a_{tz}(v')z$; $0=a_{xz}(v')z$; $0=a_{yz}(v')z$; $z'=a_{zz}(v')z$; whence $a_{tz}(v')=a_{xz}(v')=a_{yz}(v')=0$. The point$(0,x,0,0)$ corresponds to some point in IRF with coordinates $(t',x',0,0)$ by virtue of a presence of this point on axis X, and at $x>0$ we shall obtain: $0=a_{xy}(v')x$; $0=a_{xz}(v')x$; whence $a_{xy}(v')=a_{xz}(v')=0$. The origin of ARF at the moment t $(t,0,0,0)$ corresponds to a point $(t',x',0,0)$ for IRF J' by virtue of movement in IRF of the origin of ARF only on axis X', and at $t>0$ we shall obtain: $0=a_{yt}(v')t$; $0=a_{zt}(v')t$; whence $a_{yt}(v')=a_{zt}(v')=0$. As factors of matrix $A(v')$ do not depend from values of coordinates, then obtained relations are executed for all points of ARF.

Hence, for the set M_A a transformation (3) is given by :

$$\begin{aligned} t' &= a_{tt}(v')t + a_{tx}(v')x \\ x' &= a_{xt}(v')t + a_{xx}(v')x \quad (6) \\ y' &= a_{yy}(v')y \\ z' &= a_{zz}(v')z \end{aligned}$$

Projections of relative speed u' of movements ARF in IRF (inverse speed), on an axis of system J' are determined in J' for a movement of a point $(t,0,0,0)$, and look like:

$$u'_x= x'/t'=a_{xt}(v')/a_{tt}(v'); \quad u'_y=0; \quad u'_z=0.$$

Hence, a speed u' is expressed through the speed v' in an explicit kind:

$$u'=u'_x= a_{xt}(v')/a_{tt}(v') \qquad (7)$$

As the point $x'=y'=z'=0$ moves in ARF with absolute speed v' we calculate all projections of speed v′ from relation (6) :

$$v'_x=x/t=-a_{xt}(v')/a_{xx}(v');\quad v'_y=y/t=-a_{yt}(v')/a_{xx}(v')=0;\quad v'_z=z/t=0.$$

Hence, the speed v' is expressed through two elements of matrix A(v'):

$$v'=v'_x=x/t=-a_{xt}(v')/a_{xx}(v') \qquad (8)$$

Clearly what for nonzero speed v', factors $a_{tt}(v')$, $a_{xx}(v')$, $a_{yy}(v')$ and $a_{zz}(v')$ cannot be equalled to zero, otherwise det(A(v'))=0, what is impossible. In view of a condition of concurrence of a direction of corresponding axes and a relation $a_{tt}(0)=a_{xx}(0)=a_{yy}(0)=a_{zz}(0)=1$ we obtain for any speed v':

$$a_{tt}(v')>0;\ \ a_{xx}(v')>0;\ \ a_{yy}(v')>0;\ \ a_{zz}(v')>0 \quad (9)$$

The value $1/a_{yy}(v')$ determines on axis Y in ARF a change of the size of the body moving in ARF along axis X. For definition of factor $a_{yy}(v')$ we shall consider in ARF two motionless bodies: a cylinder with radius R_1, a cartridge with internal radius R_2, $R_2>R_1$. It is possible to set size R_2-R_1 as much as small. Cylinder is in cartridge. We shall assume that for some speed v' the size $a_{yy}(v')<1$. Now let's to move the cylinder along axis X with a speed v'. In IRF of the cylinder its radius also will be R_1, according to a line moving side by side with the cylinder. Then in ARF the radius of the cylinder will be $R_1/a_{yy}(v')$, and beforehand it would be possible to choose such R_2, that $R_1/a_{yy}(v')>R_2$. But then in ARF the cylinder cannot be a moving body, as a crossing of the cartridge with the cylinder has nonzero volume. That is, it should be executed: $a_{yy}(v')\geq 1$. We shall assume that for some speed v' the size $a_{yy}(v')>1$. Now let's to move a cartridge along an immobile cylinder with a speed v'. In ARF internal radius of the cartridge will be $R_2/a_{yy}(v')$, and beforehand it would be possible to choose such R_1, that $R_2/a_{yy}(v')<R_1$. But then in ARF the cartridge cannot be a moving body, as a crossing of the cartridge with the cylinder has nonzero volume. That is, it should be executed $a_{yy}(v')\leq 1$. Thus, it can be only: $a_{yy}(v')=1$. The relation $a_{zz}(v')=1$ is proved similarly.

From the relation (8) we obtain $a_{xt}(v')=-a_{xx}(v')v'$. Hence, for a set M_A transformation (3) is given by :

$$\begin{aligned} t' &= a_{tt}(v')t + a_{tx}(v')x \\ x' &= (x-v't)a_{xx}(v') \qquad (10) \\ y' &= y;\ z'=z \end{aligned}$$

If synchronization in IRF J' is executed with the help of method MSN, then concurrence of the moments of time of two events (t,x_1) and (t,x_2), ($x_1\neq x_2$) in ARF corresponds to concurrence of the corresponding moments of time of these events (t',x'_1) and (t',x'_2) in IRF. We use these values for substitution into (10): $t' = a_{tt}(v')t + a_{tx}(v')x_1$; $t' = a_{tt}(v')t + a_{tx}(v')x_2$; and obtain $(x_1-x_2)a_{tx}(v')=0$, that is:

$$a_{tx}(v')=0 \quad (11)$$

5. Conclusion of transformations of coordinates in Absolute (ET). The formula of relative speed. Invariance of physics lows.

Maxwell has assumed that in preferred IRF in which the medium for propagation of electromagnetic waves (Maxwell's aether) is motionless, conditions for distribution of electromagnetic waves are isotropic. In terms of given article the preferred frame of reference is named *the absolute frame of reference* (ARF). By virtue of isotropic properties of medium (different authors calls it Maxwell's aether, luminiferous aether, Dirac sea, conglomerate of electromagnetic and gravitational fields, physical vacuum, vacuum, etc), a speed of light in it is isotropic and its value is equal to some constant "c" in ARF. That is, in terms of given article the Maxwell's Assumption means **a postulate** *of existence of isotropic ARF*:

P_1: In ARF the speed of light in vacuum is isotropic.

But as the Earth has moved among stars, there was expectation that in frame of reference of terrestrial laboratory an effect of change of light's speed (*effect of an aether's wind*) should exist. On a boundary of 19-th and 20-th centuries Michelson and Morley did a number of experiments (MME) to find a possible influence of an aether's wind onto speed of distribution of electromagnetic waves. Experiment with enough high accuracy has shown absence of influence of an aether's wind onto the period of passage of a "*two-way*" light's signal though even Michelson and Morley managed to registrate very small displacement of fringe of interference strips. Results of their measurements show, that quite measurable displacement of strips took place, but they were very small; therefore they were considered casual though they were periodic. [6, Pics 11.3-11.7] (But I think that tiny displacement occur because ways of two beams pass through areas with the different gravitation dependent on position of the interferometer on the Earth concerning the Moon and the Sun. The annual period, 28-day's period, and 23-hour period of the displacement are due to this.) Therefore we suppose, that in conditions of weak gravitation practically zero result of MME is appearance of **a postulate** of *isotropic time* :

P_2: In anyone IRF in vacuum the time of "*two-way*" movement of a light's signal along the linear contour not depend on position of this contour.

Oboukhov and Zakharchenko offered these two principles in a little bit other formulation. [2]

With the help of these principles we shall deduce transformations of coordinates between ARF and IRF.

Let the origin of IRF *J'* is moving in ARF *J* with a speed ***v***. We shall write out a general view of linear transformations of coordinates from *J* in *J'* in case of concurrence at the initial moment t=0 of corresponding axes of these coordinates IRF, and the vector ***v*** is directed in a positive direction of axis X :

$$t'=a(v)x+b(v)t;\ \ x'=d(v)(x-vt);\ y'=y;\ z'=z \qquad (12)$$

renaming in (10) the speed v' and factors $a_{tt}(v'), a_{tx}(v'), a_{xx}(v')$ of matrix A(v').

We shall name a finding in an obvious kind of functions $a(v), b(v)$ and $d(v)$ under some conditions as the decision of a task of search of a transformation matrix under these conditions.

As known, Einstein has obtained such decision for two IRFs (named Lorentz's transformations: $a(v)=-\gamma v/c^2$, $b(v)=d(v)=\gamma$, where $\gamma=\gamma(v)=[1-(v/c)^2]^{-½}$) under condition of performance in all IRFs of <u>two postulates</u>: speed of light is a constant *"c"*; laws of physics are invariant; and <u>assumption</u> that transformation of coordinates between IRFs depends only on one parameter - a relative speed of IRFs. Thus, he has refused a hypothesis about existence of an aether, as superfluous, and hypothesis about the preferred frame of reference, as contradicting to principles of the theory. But this refusal is not final as it is not proved, that SRT is the unique true theory for description of IRFs, and that under other conditions there will be no other decision of the same system.

Let's note, that at absence of a postulate on a constancy of light's speed in all IRFs a synchronization in IRF *J'* cannot be executed by Einstein's method and moved clock's method as it is not known, whether there a light's speed is isotropic in *J'*. Therefore synchronization in IRF J' can be executed only by method MSN, not dependent on speed of light. According to (11) in this case it will be $a(v)$=0.

Thus, from (12) we obtain system of the equations:

$$t'=b(v)t;\ \ x'=(x-vt)d(v);\ y'=y;\ z'=z \qquad (13)$$

To compare durations of the same process in ARF and IRF, we should use identical reference clocks, motionless in these reference frames (RFs). A time unit in everyone RF will be identical quantity of repeating processes in such clock.

Considering the device (Michelson interferometer) as a "light's clock", making one full cycle of actions from the beginning of movement of a light's pulse until it return to the same point, and using the time unit "one full cycle of the device" in IRF, we obtain for a movement of a light's pulse along a linear trajectory, perpendicular in *J'* to speeds v, that in ARF *J* a way of this pulse in γ times longer, than the way of a pulse along axis Y in *J*, therefore one full cycle $\boldsymbol{t}_2'$ of clock in IRF *J'* will be executed during time γt_2 on the same device, motionless in *J*. That is, the time in terms of "a full cycle" in *J'* goes more slowly in γ times, than in terms of "a full cycle" in *J*. But this special case of comparison of time in different IRFs should be expressed by the common formula (13): $t'=b(v)t$, whence we obtain $b(v)=1/\gamma$. From here it follows that in *J'* light's speed along axis Y' is equal "*c*". Thus, here the physical reason of reduction of rate of the clock, moving in ARF, is shown; it is its movement in the medium with isotropic speed of light. But in SRT there is no preferred frame of reference with the motionless medium and there is no the medium, hence, there are no a physical reason bound with the medium for reduction of the clock's rate.

In experiment MME there are two mutually perpendicular arms. Let's choose in *J'* an arrangement of one arm SL along a vector *v*, another shoulder SH is perpendicular to *v*. Let the pulses of light will start to move simultaneously from point S located in the origin (0,0,0,0). We designate in *J'*:

H' is length of arm SH, perpendicular to v;
L' is length of longitudinal arm SL;
t_2' is the moment of return of a perpendicular light's pulse to point S
t_4' is the moment of return of a longitudinal light pulse to point S.

Values corresponding to them in *J* we designate H, L, t_2 , t_4. It is necessary to remember, that in *J* points H, L, R are moving, arms (as segments of straight lines) of the device remains perpendicular, but a trajectory of the light's pulse going from the origin to point H, is inclined. According to condition of experiment, lengths of arms in *J'* are equal: $L'=H'$. According to (13) from the formula $y'=y$ it follows $H'=H$, and in *J* from a condition of a simultaneity of measurement of length L of moving arm L' we obtain a formula of its longitudinal length $L'=d(v)L$, that is $d(v)L=H$.

Calculation in ARF gives time of movement of signals $t_2=2\gamma H/c$ and $t_4=2\gamma^2 L/c$. On the postulate P2 the times of passage of signals are identical $t_2'=t_4'$ in *J'*, and by virtue of a relative simultaneity we obtain identity of the times $t_2=t_4$ in *J*, whence follows $H=\gamma L$, that is we obtain a formula for factor $d(v)$=: $d(v)=\gamma$.

Note an independence from each other of these conclusions of values $b(v)$ and $d(v)$.

Thus, transformation of coordinates from ARF into IRF, not contradicting to results of Michelson-Morley experiment, is given by :

$$\mathrm{A}(v):\quad t'=t/\gamma;\ x'=\gamma(x-vt);\ y'=y;\ z'=z \qquad (14)$$

Let's name this transformation as *Eagle Transformation* (ET) [9], considered by R. Eagle in 1938. The theory bound to these transformations was named by N.V. Kuprjaev [3] the *Theory of anisotropic space* (TAS). By this theory an increasing of a lifetime of fast muons, both Doppler effects, and other effects are explained. [2,3]

Thus, our concept of Absolute space differs from the Absolute Galilee.

For recalculation of coordinates from IRF_1 into IRF_2 it is necessary to transform them first from IRF_1 into ARF, and then from ARF into IRF_2, so we obtain two-parametrical transformations $\mathrm{B}(v_1,v_2)$:

$$\mathrm{B}(v_1,v_2)=\mathrm{A}^{-1}(v_1)\mathrm{A}(v_2) \qquad (15)$$

If a direction of vector $\boldsymbol{v}$ of IRF *J'* in ARF is voluntary, then there is a rotational displacement $\mathrm{P}(\boldsymbol{v})$, after its realization a direction of axis X will coincide with the direction of vector $\boldsymbol{v}$. We add a definition $\mathrm{P}(\mathbf{0})=\mathrm{E}$. We rotate 3 space axes of ARF at the same angle and obtain a new ARF'. Now we choose such an IRF *J'* that at the moment $t=0$ its corresponded axes of coordinates coincide with the axes of ARF'. Then a transformation $\mathrm{A}(\boldsymbol{v})$ of coordinate (t,x,y,z) between ARF and IRF is:

$$\mathrm{A}(\boldsymbol{v})=\mathrm{P}^{-1}(\boldsymbol{v})\mathrm{A}(v)$$

And for recounting of coordinate from IRF_1 into IRF_2 a formula is obtained:

$$\mathrm{B}(\boldsymbol{v}_1,\boldsymbol{v}_2)=\mathrm{A}^{-1}(\boldsymbol{v}_1)\mathrm{A}(\boldsymbol{v}_2)=\mathrm{A}^{-1}(v_1)\mathrm{P}(\boldsymbol{v}_1)\mathrm{P}^{-1}(\boldsymbol{v}_2)\mathrm{A}(v_2)$$

These formulas are generalization of formulas (14) and (15) for a case of IRFs, velocities of which not obligatorily are parallel to axis X of ARF.

In transformations A() and B() there is no dependence of time on coordinate x. Note that such dependence is in Lorentz transformations. Also note that formulas of dependence of time's intervals in ET and Lorentz transformations for recalculation from ARF in IRF coincide.

$$t'_2-t'_1=(t_2-t_1)/\gamma \qquad (16)$$

but in ET formulas of dependence of time's intervals for recalculation from IRF J_1 in IRF J_2 differs from the formula of Lorentz transformations:

$$(t''_2-t''_1)/(t'_2-t'_1)=\gamma_1/\gamma_2 \qquad (17)$$

where $\gamma_m=\gamma(v_m)$; m=1,2; v_m is an absolute speed of IRF_m; that is, rate of time in IRF_2 relatively IRF_1 can be both more than 1, and less than 1, depending on a ratio of their absolute speeds.

Also in ET and Lorentz transformations for a moving body in ARF the formulas of reduction of longitudinal length coincide :

$$x_2-x_1=(x'_2-x'_1)/\gamma(v) \qquad (18)$$

where $x'_2-x'_1$ is longitudinal length of a body in its own IRF.

In TAS the formula of dependence of relative speed $u=(u_X,u_Y,u_Z)$ of object in IRF with its absolute speed $w=(w_X,w_Y,w_Z)$ is given by :

$$u_X=dx'/dt'=\gamma^2(v)(w_X-v);\ u_Y=dy'/dt'=\gamma(v)w_Y;\ u_Z=dz'/dt'=\gamma(v)w_Z \qquad (19)$$

then speed of light $\boldsymbol{c}=(c_X,c_Y,c_Z)$ in IRF will be $\boldsymbol{c}'=(c'_X,c'_Y,c'_Z)$:

$$c'_X=\gamma^2(v)(c_X-v);\ c'_Y=\gamma(v)c_Y;\ c'_Z=\gamma(v)c_Z \qquad (20)$$

Let's designate a is an angle of a rejection of a light's pulse trajectory from axis X in ARF. For a it is executed : $c^2\sin^2 a=(c_Y)^2+(c_Z)^2;\ c^2\cos^2 a=(c_X)^2$. In IRF we calculate $(c')^2$: $(c')^2=((dx')^2+(dy')^2+(dz')^2)/(dt')^2=\gamma^4(v)(c-v\cos a)^2$, whence:

$$c'(v,a)=c\gamma^2(v)(1-(v/c)\cos a) \qquad (21)$$

It is necessary to distinguish concepts: angle of figure and angle of an declination of trajectory. In particular, axis Z' will be perpendicular to axes X' and X; the angle of an declination of a hypotenuse of a triangle in ARF will differ from its declination in IRF due to change of length of the cathetus, laying on axis X; and the angle of an declination in ARF of trajectory of a body moving along axis Y' in IRF, depends on speed of the body.

Let's designate a' is an angle of a rejection of a light's pulse trajectory from axis X ' in IRF then it is possible to obtain a relation between a' and a :

$$tg\ a' = \frac{\sin a}{\gamma\ v\ *(\cos a - {}^{v}\!/_{c})} \qquad (22)$$

Only if the ray of light in IRF goes on axis Y' then cos $a=v/c$ and from (21) we obtain:

$$c'=c. \qquad (23)$$

Thus, time's and length's units of IRF in TAS cannot be founded on speed of light in IRF, as this speed is anisotropic.

From formula (19) we obtain in TAS a dependence of relative speed u of a body along axis X' in IRF with its absolute speed w:

$$w=v+u/\gamma^2(v),\ i.e\ u=(w-v)\gamma^2(v) \qquad (24)$$

At $w=0$ the value u is a speed of ARF in IRF (*returned* to speed v of IRF in ARF), and module u is not equal to the module of speed v :

$$u=-v\gamma^2(v) \qquad (25)$$

Let's consider in ARF some physical effect. Let it is described by a set of parameters P (measured in terms of ARF) which are linked by system of equation $Q(P)$. At consideration of the same effect in IRF in its description a dependence $Q(v,P(v))$ on a vector of speed v of this IRF in ARF can appear; but it can not be added any more dependences as the IRF is characterized in ARF only by speed v .

Thus, the formula of effect in anyone IRF has identical appearance $Q(v,P(v))$. However this conclusion does not coincide with a principle of a relativity of Einstein as here in addition to relative speed there can be a dependence on absolute speed of IRF in ARF.

6. Method MSM is not serviceable in IRF with anisotropic speed of light

We shall show, that the method of moved clock (MSM) is not serviceable in IRF TAS (with anisotropic speed of light), that is, at aspiration of absolute speed of clock to speed of IRF the indication of moving clock will not aspire to indications of clock motionless in this IRF. This example of inapplicability of MSM means that in any theory it is impossible to count a priori feasible such method of synchronization of clock.

Let v is absolute speed of IRF in ARF. Let, a clock C" is moving with relative speed u in IRF in a positive direction of axis X. Absolute speed of clock C", according to (24), will be $w=v+u/\gamma^2(v)$. At u--->0 value w--->v , as $\gamma(v)$ does not depend on u. Let origins of ARF, IRF and own IRF of clock C" coincided. We shall consider in IRF a motionless segment [0,x']. Clock C" move from a point 0 to a point x': $x'>0$. Indication of clock C' at a moment of arrival of clock C" to a point x' was $t'=x'/u$, hence a time of this event in ARF was $t=t'\gamma(v)$, and indications of clock C" in a point x' was $t''=t/\gamma(w)$ as its absolute speed was equal w.

Let's calculate $t''-t'$ - a difference of indication of moving clock and indication of clock that motionless in IRF :

$$t'' - t' = \frac{t}{\gamma(w)} - \frac{x'}{u} = \frac{x'c^{-2} * (u\gamma(v)^{-2} + 2v)}{\frac{\gamma(v)}{\gamma(w)} + 1}$$

It is obvious, that $t''-t'$---> $-x'v/c^2$ at u--->0. Thus it is not equal to zero at v> 0. And method of moved clock is not serviceable.

7. Shift of clock's indications

An isotropy of light's speed in homogeneous IRF means that speed of light does not depend on place and time of measurement and also on a direction of light's distribution; *anisotropy* of light's speed in homogeneous IRF means that speed of light does not depend on place and time of measurement but depends on a direction of light's distribution.

We shall designate coordinates of points in IRF: $(t',x',y',z')=\boldsymbol{J}'$; $r(x',y',z')$) - a radius-vector from a point (0,0,0); $v^{(1,2)}=v^{\prime\prime\prime}$ is a relative speed J " in J".

Let's consider an example of construction of some IRF I' on base of any IRF J'. In the model of IRF J' we shall add to clock C_J in any point one more motionless clock C_I. Rate of time of both clock is obliged to be identical. If there are the reasons influencing rate of time of clock C_J in some point of IRF, then the same reasons precisely also influence clock C_I in the same point. Therefore, if these clocks show identical time at some moment then their indications will be identical always, and if miscellaneous then the same difference of indications will be always. If even in one point such pair of clocks shows different time, then, by definition, these clocks belong to miscellaneous FRs motionless relatively each other. We shall designate the second RF as I'. In this RF I' metric coordinates of events coincide with coordinates in IRF J', but coordinates of time on these clocks can be different, though time intervals between events will coincide. Difference of indications of clocks C_I and C_J in any point we shall name *Shift of clock's indications* (SCI) in this point. Generally SCI depends on coordinates of a considered point. And not for any combinations of SCI in different points we can consider the RF I' as inertial.

We shall find conditions on SCI, at which RF I' is inertial.

Shift of clock's indications in IRF means once executed procedure of change of indications of the earlier synchronized motionless clock. A value of SCI $S(\boldsymbol{r})$ bound with coordinates $\boldsymbol{r}$ of place of clock in IRF. A process of shift of clock's indications is final in time, and for a considered clock is doing only once in any IRF. Without restriction of a generality it is possible to consider, that shifts of all clock occurred in the far past, and during consideration of any events a SCI are not occurred and are not subject to the experimenters who are carrying out supervision. Therefore a value $S(\boldsymbol{r})$ will not depend on time after the termination of procedure of shift of clock's indications for each point.

Let SCI in some point $r(x',y',z')$ is $S(\boldsymbol{r})$, t' is a time's coordinate in J', T' is a time's coordinate in I'. Then we can write

$$T'=t'+S(r(x',y',z')). \qquad (26)$$

As far we consider the RF with coincided origins, then $S(0)=0$. Note, that I' is motionless in J'. Due to SCI the time's coordinates of the same event will be different, but coordinates of place does not change, so properties of speed is changing. For I' to be inertial, it must be fulfilled properties of IRF in it. In particular, an object, uniformly and rectilinearly moving in J' with a speed w, should uniformly and rectilinearly move with some speed u in I'. Hence, for the object moving from the origin of coordinates, it will be executed:

$$r/u-r/w=S(r), \qquad (27)$$

and for any point kr on a line r it will be executed $kr/u-kr/w=S(kr)$, whence we receive

$$S(k\boldsymbol{r})=kS(\boldsymbol{r}), \qquad (28)$$

where k is any real number, $\boldsymbol{r}$ is any vector which has been lead from oridin of coordinates. This is a property of linearity of function $S(\boldsymbol{r})$ on parameter $\boldsymbol{r}$.

For any two points $\boldsymbol{r}''$ and $\boldsymbol{r}'$ a SCI between them is equal $S(\boldsymbol{r}'')-S(\boldsymbol{r}')$, and by virtue of linearity of S we obtain (even for nonparallel vectors):

$$S(\boldsymbol{r}'')-S(\boldsymbol{r}')=S(\boldsymbol{r}''-\boldsymbol{r}'). \qquad (29)$$

Having designated through $s_N=S(\boldsymbol{r}_N)$ a value of SCI for unity vector (*norm of shift*) in some direction N, we obtain a relation for a shift S_N of indications of clock for an any vector at this direction and for its length L_N: $S_N(L_N)=L_N s_N$. In particular, if direction N is a direction of axis X of IRF J' (then L_X is a coordinate

x'), then in this case s_X means a size of shift for an unity vector in positive direction of X, and SCI is following:

$$S_X(x')=x'\, s_X\,. \qquad (30)$$

From properties (29) and (30) the formula of representation of shift $S(\boldsymbol{r})$ for this vector through its Cartesian coordinates (x',y',z') and norms of shift on axes follows:

$$S(\boldsymbol{r})=Ls(\boldsymbol{r})=x's_X+y's_Y+z's_Z \quad (31)$$

where $L=(x'^2+y'^2+z'^2)^{1/2}>=0$ is a length of a vector $\boldsymbol{r}$, $s(\boldsymbol{r})$ is a norm of shift at direction of vector $\boldsymbol{r}=(x',y',z')$, s_N is a norm of shift at direction of axis N, N=X,Y,Z.

Thus, anyone RF I', constructed on base of IRF J' with help of SCI with property (31), is inertial RF, as this RF is moving uniformly and rectilinearly in ARF (and as I' is immobile in J'), and anyone IRF is moving uniformly and rectilinearly in I'.

8. Deducing of Lorentz transformations. An isotropy of light's speed

Let's consider in TAS some IRF J', moving in ARF with a speed v. Set of all IRF J' we shall designate M_A. In IRF J' we shall designate $c(\boldsymbol{r})$ - speed of light in a direction of a vector $\boldsymbol{r}$, this size is set by the formula (21). From it follows that, except for ARF, in anyone IRF TAS a speed of a light's signal is not isotropic. But the formula (27) shows that at use of shift of indications of clock a speed of object in new IRF SRT I' can change. We shall try to find such SCIs that speed of a light's signal would be a constant in anyone I'. A set of all possible new IRF I' with constant speed of light we shall designate M_L. ARF belongs both M_A, and M_L. To distinguish ARF in these sets, we shall designate it J - in M_A, and I - in M_L. A speed of light is equal c" in I and in I' under of a condition of their building-up, that is, according to formulas (27) and (30) required norm of SCI $s(\boldsymbol{r})$ for construction I' turns out: $s(r)=1/c-1/c(\boldsymbol{r})$. Therefore, according to formulas (21), (23) and (22) we obtain a norm of SCI: $cos(a)=v/c$ for axes Z',Y' and $cos(a)=1$ for axis X', and we have norm of SCI on directions of axes J':

$$s_X=-v/c^2;\ s_Y=s_Z=0. \quad (32)$$

I' is motionless in J', therefore I' moves in I with the same speed v. Thus, in set M_L for any speed v there is IRF I' (with isotropic speed of light). We shall find transformation of coordinates between I and I'. Event (t,x,y,z) in I has coordinates in J': $(t',x',y',z')=(t,x,y,z)A(v)$, and has coordinates (T',x',y',z') in I', where $T'=t'+x's_X$, according to formulas (26,30). Therefore transformation for coordinates x',y',z' coincides with ET (14), and transformation for coordinate of time t' will change in view of value s_X in (32) and expression of values t' and x' in(14):

$$L(v): T'=\gamma(t-xv/c^2);\ \ x'=\gamma(x-vt);\ y'=y;\ z'=z \quad (33)$$

Thus, the constructed transformations are Lorentz's transformations. It's known that Lorentz's theory is based on SRT postulates as Lorentz at conclusion of his transformations used an invariance of Maxwell lows and invariance of light's speed in different IRFs. Hence, Lorentz could not obtain other variant, except for as limited SRT for one preferred IRF with motionless Maxwell medium. Thus, the model constructed here containing preferred ARF, a set of IRF with constant speed of light and transformation L(v) (33), actually is model of the theory of Lorentz.

It is very surprising that transformations of coordinates from completely different theories are bound only by shift of indications of clock.

Naturally, transformations of coordinates between I' and I'' also appear as Lorentz's transformations with parameter $v_{1,2}$ - relative speed I'' in I', obtained according to the relativistic subtraction formula of speeds I'' and I' in I.

Set M_L of all IRF with isotropic speed of light, considered in SRT, does not coincide with set M_A of all IRF, considered in TAS. However construction of M_L and Lorentz's transformations does not mean that thus the SRT is obtained. Obviously, in postulates TAS and in shift of clock's indications there is no dependences with all physical processes, hence from them it is impossible to receive the formulation of the Einstein's Principle of relativity; besides in set M_L there is an preferred frame of reference I, the unique motionless frame in ARF TAS from which norms SCI of others IRF I' are calculated.

Whence and how in M_L is appeared a relativity? Surprisingly, it is our action - shift of indications of clock with norm (32) - brings in constructed IRFs the property of a relativity for space and time. It is obvious that motionless clock in IRF go more slowly than the same motionless clock in ARF, and $dt'=dt/\gamma$. But when in ARF we consider a motionless clock then in IRF I' this clock is moving, and an interval of time dt' is measured in different points of I'. Without SCI we obtain $dt=\gamma dt'$, that is, all the same motionless clock in IRF goes more slowly of the same motionless clock in ARF, and at presence of SCI a value of dt' will change and will be dT', that is, an interval of time $dT'=dt'+sdx'$ cannot be equalled dt/γ any more. But there is such norm of SCI (32) that other, symmetric ratio $dT'=dt'+sdx'=\gamma dt$, is carried out, and it means that clock in I goes more slowly of clock in I': $dt=dT'/\gamma$. So, this delay isn't provided by rate of clock's indications, but by SCI. Similarly for length of a piece - after change of concept of a simultaneity for account of SCI, it is obtained that the motionless piece in I is longer than its length measured in I'. Thus, a SCI with norm $s=-v/c^2$, brings in constructed IRF a property of a relativity for space and time.

Precisely same method of shift of indications of clock for set M_L is possible for constructing a set of IRF M_A, but only having chosen as ARF that unique IRF I in which *Luminiferous Aether* is motionless. It is natural that in this case SCI destroys in constructed IRF *J'* a property of a relativity for space and time.

Shift of indications of clock, being physical action means that if in the Universe the Lorentz's transformations are carried out the ET are carried out too; and if the ET are carried out the Lorentz's transformations are carried out too; also shows the reason of why we can count the Universe and Absolute, and Minkowski space. That is, this theory can become the idea of the uniting of supporters and opponents of SRT. However as now it is clear that IRFs with anisotropic speed of light can exist it is necessary to soften the formulation of a Einstein's postulate *"Speed of light in vacuum is identical in all inertial frames of reference "* [4, p.147], for example, so: "It is possible to count inertial frames of reference such, that speed of light in vacuum in them is constant ", or even so " If to assume, that inertial frames of reference are those that speed of light is constant in vacuum in them, and transformations of coordinates between IRFs possess symmetry then these transformations look like Lorentz's transformations". And the opportunity of such assumption follows from Absolute.

The genius of Einstein was in that that he not knowing about this opportunity had managed to formulate this previous conclusion as his principles of SRT, and this unknowing does explain the categorical form of his postulates: "... It is carried out in all IRFs".

Whether there is an advantage at any of these models or geometries? At geometries - is not present. But at models, I think, there is. Experiments show that a quickly moving clock has rate of time that distinguished from rate of motionless clock. But then there should be a physical reason of different rate of time of clock. TAS gives this an explanation (there is an preferred frame of reference, in which there is an medium (universal, all-penetrated, infinite, motionless), results of supervision over cyclic processes in which depend on speed of movement of the observer), but SRT such physical reasons does not give, as in it there can not be an medium, motionless in everyone IRF.

9. Replacement of variables. Transformations of Lorentz's, Galilee and ET

At transition from IRF J' TAS to IRF I' SRT we change coordinate t' on $T'=t'-vx'/c^2$, that is, we make some replacement of variables $Z_{AL}(v)$. Thus, for transition from ET to Lorentz's transformations we can write down: $\boldsymbol{I'}=\boldsymbol{J'}Z_{AL}(v)$. But in view of ratio: $\boldsymbol{J'}(v)=\boldsymbol{J}A(v)$, $\boldsymbol{I'}(v)=\boldsymbol{I}L(v)$ and $\boldsymbol{J}=\boldsymbol{I}$, we receive expression of a matrix of replacement of variables through matrixes of transformations of coordinates in these theories:

$$Z_{AL}(v)=A^{-1}(v)L(v). \quad (34)$$

Similarly, for transition from ET to transformations Galilee we receive replacement of variables:

$$Z_{AG}(v)=A^{-1}(v)G(v), \quad (35)$$

where $G(v)$ - a matrix of transformations Galilee, v - speed of both IRF in ARF. Here already varies and t' and x'. The set of IRF which is considered in TAS, does not coincide with set of IRF in the theory Galilee.

There is point of view in our days that the theory Galilee is only an approximated reflection of real dependences in the Universe for small relative speeds. It is a wrong view. What is the transformations Galilee? This transformation of coordinates. But for definition of a point's place not enough only values of coordinates, the units of measurements are necessary too. Therefore a question: «Whether transformations Galilee can precisely be carried out? » should be understood so: «Whether can exist in the Universe such IRFs and units of measurements in them that for these IRFs the transformations of coordinates Galilee would carried out?» It is surprising, but the answer is positive for any speeds. Moreover, in such IRF three-dimensional spaces will be Euclidean. Only spatial isotropism will not be in them, that is, in everyone IRF in different directions the units of measurement can be different length. But transformation of coordinates between such IRF will be Galilee's!

For transition from Lorentz's transformations to transformations Galilee exists replacement of variables:

$$Z_{LG}(v)=L^{-1}(v)G(v). \quad (36)$$

that is, $t'_G=\gamma(t'_L+vx'_L/c^2)$; $x'_G=x'_L/\gamma$; $y'_G=y'_L$; $z'_G=z'_L$; where the index means a belonging to Galilee's or Lorentz's coordinates.

Set of IRF, considered in SRT, does not coincide with set of IRF in the theory Galilee. Einstein has not paid attention to this fact, having left a definition Galilee for inertial system of coordinates to be carried out in SRT. [4,p.130] This discrepancy is marked by me in article "the Analysis of the book of A.Einstein, L.Infeld "EVOLUTION of PHYSICS" ".[5,#5]

10. Non-inertial movements

Let's assume that movement of a body in ARF is *smooth*, that is, for any point of its trajectory there is a bilateral limit of the *chord* speed, conterminous with *instant* speed of movement of a body in this point (that is, speed of the certain body moving through the specified point at a tangency to this trajectory).

Relation of coordinates of a body in ARF and IRF does not depend on of a movement of this body, therefore the matrix of transformation of coordinates A(v) is executed and for non-inertial body's movement in IRF, that is, for instant speed it remains true a formula (19) of dependence of the body's relative speed $u=(u_X,u_Y,u_Z)$ in IRF with its absolute speed $w=(w_X,w_Y,w_Z)$. That is, there are partial derivatives of these velocities, and relations between them are next:

$$\partial u_X/\partial t'=\gamma^3(v)\partial w_X/\partial t;\ \partial u_Y/\partial t'=\gamma^2(v)\partial w_Z/\partial t;\ \partial u_Z/\partial t'=\gamma^2(v)\partial w_Z/\partial t \quad (37)$$

This formula shows that nonzero acceleration of the body in ARF is nonzero in any IRF. But in *own RF* (ORF) the body's acceleration must be zero, hence, if a body's movement becomes non-uniform or not rectilinear under action of some force, then in its ORF the ET is not carried out at any moment, but only at these moments when an action of these forces can stop and the condition of movement of the body and its frame of reference cannot change any more. Thus, with help of a matrix A(v) it is possible to receive units of measurements for ORF of a body moving arbitrarily at each moment of its movement. That is, transformation of coordinates from ARF into ORF (it is interesting that a model ORF is equal to the above-stated model of IRF (part.3)) essentially depends on acceleration of the ORF in ARF. Hence, none IRF can describe events in the accelerated ORF. However, an observer in his ORF describes events, uses a someone standard meter for determining its coordinates, and there is clock at anyone point of ORF. It will be other question, what length would have this meter in ARF and what relation would between indications of clocks in ORF and in ARF, but doubtlessly such physical relation there is, because of the same events takes place in ARF. Thus, it becomes obvious an existence at any moment of functions of coordinate's transformation from ARF into ORF for the given smooth absolute velocity of observer and his given acceleration.

That is, and for non-inertial movement of bodies, and for non-inertial frames of reference a description of processes in ARF is possible. The Minkowski space is not necessary for identifying with the Universe, all events can be described in linear space.

11. What object in the Universe we can bind ARF to?

We have the confirmation of existence of such «object». Cosmic Microwave Background Radiation (CMBR), being the waves of an electromagnetic field formed in any place of the Universe and at any time (in GR - during limited time), carries the information that places of their origin are practically motionless from each other. And only the property of isotropy for light's waves allows us to determine the speed in an isotropic aether because of their speeds and frequencies change and depend on a direction in IRF.

Now we have an explanation in Absolute by point of view of TAS for all those reasons that Einstein wrote for the benefit of postulates of SRT [4, part.3]:

1. *"Aether dragging or dragging of light by aether. Speed of light from moving and motionless* sources." [4,p.139-140] The Ether does not dragged along by bodies. Speed of light in ARF and IRF from movement of a source does not depend, speed of light in IRF for a receiver depends on speed IRF in ARF.

2. *"Light from double stars"* [4,p.140]. It comes to us simultaneously as speed of light's waves in ARF is identical, and in ours RF a direction on these stars and distances up to them practically coincide. Therefore any complex movement of double stars it is not observed.

3. *"Whether the aether dragging by a very quickly rotating wheel is possible?"* [4,p.141] The ether does not dragged along by bodies. Speed of light going by a rim of a wheel, does not depend on movement of a wheel.

4. *"Measurement of speed of light in a moving room by internal and external observers. ...only in one system of coordinates connected with the aether sea, the speed of light would be identical in all directions. In other system, moving relatively the aether sea, it would depend on a direction in which measurement is made.*"[4,p.142-143] So it also is, if clocks are synchronized by method MSN. Speed of light in IRF depends on method clock's synchronization, and also the observable geometry of 4-dimensional space does.

5. "*In a famous Michelson-Morley experiment... any dependence of light's speed on a direction it was revealed not."*[4,p.144]. It's obviously that in this experiment a change of speed of light do not determined, but only a dependence on a direction of total time of movement of a light's wave on a two-way trajectory. Thus the null result of MME concern only two-way journey of light, not one-way.

So here the one-way speeds of light's waves can be different, and the total times of its movement on a different two-way trajectories - identical.

But as our Earth is not inertial system so the first statement cannot be checked up with sufficient accuracy, hence, is only the assumption.

6. *"In two systems of coordinates, moving rectilinearly and in regular intervals relatively each other, all laws of the nature are strictly identical, and there are no means to find out absolute rectilinear and uniform movement."* [4,p.145]. The answer is available in the same place [4,p.130]: "*If two systems of coordinates move relatively each other non-uniformly, laws of mechanics cannot be fair in both systems simultaneously."* But as our Earth is not inertial system so the first statement cannot be checked up with sufficient accuracy, hence, this principle is only an assumption.

12. Conclusions

In this article:

1. The method of synchronization of clock, not dependent on light's speed is described.

2. Transformations of coordinates between inertial frames of reference in Absolute space are deduced.

3. Sets of inertial frames of reference in the theory Galilee, SRT and TAS do not coincide.

4. The set of inertial frames of reference with constant speed of light is constructed, for them Lorentz's transformations are deduced.

5. The principle of a relativity for movement grows out shift of clock's indications.

6. The Minkowski space is not necessary for identifying with the Universe, all events can be described in linear space.

The literature

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