Based on another interpretation of the law of invariance of light speed reconstruction of general relativity as well as integration with special relativity and partial relevance to early quantum mechanics

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1 Special relativity, its properties and another interpretation of the principle of invariant speed of light.

Based on Newtonian mechanics, physics was divided into thermodynamics, rigid body mechanics, fluid mechanics, etc., and evolved into electromagnetics that the first field dynamics. Later, based on electromagnetism, newtonian mechanics evolved into Hamiltonian mechanics which were expressed in different interpretations. After that becoming the first quantum mechanics, evolved into late quantum mechanics incorporating special relativity. It is a basic theory at present.

I focused on special relativity theory and general relativity theory, and changed it's interpretation and devised another general relativity theory. I would like to let you describe the theory.

2 Another interpretation of the principle of invariant speed of light

The speed of light, which is an electromagnetic wave, is C= 299 792 458 m / s, and it is a well-known fact that it is constant from any velocity coordinate. However, the apparent speed of light changes to v = csinθ just by observing the observed coordinates diagonally. In other words, light has the property that only the speed change in the same direction ⊿V = C-V does not appear, which is the principle of invariant light speed.

So let's think about what happens to the speed of sound from the viewpoint of sound. Under these conditions, there is a non-changing coordinate system that is air, and there is no coordinate system that moves at a velocity V relative to the coordinate system called Galileo transformation. In addition, there is no conversion represented by X′ = (C-V) X. At that time, the velocity of the sound wave is constant and the apparent velocity is observed as an angular resolution of the velocity. Therefore, I thought that if all materials were made of light, they would naturally have properties like the law of invariant light velocity. And the substance existing in this universe is originally traveling at the speed of light and looking at the observed coordinates obliquely, so it is thought that it is traveling at a speed of V = Csinθ.

In order to express that this cosmic material is traveling at the speed of light, we will increase the coordinates of the pythagorean theorem by one and represent the line segment equation to four dimensions.

$$(ct_0)^2=X_0^2+(v_1t_0)+(v_2t)^2+(v_3t)^2=X_0^2+(vt_0)^2$$

It becomes. So X_0 is

$$X_0=\sqrt{c^2-v^2}\ t_0=\sqrt{1-\left(\frac{v}{c}\right)^2}\ ct_0$$

It is represented.

If $\Gamma=\frac{1}{\sqrt{1-\left(\frac{v}{c}\right)^2}}$ the line segment formula is

$(ct_0)^2=(\frac{1}{\gamma}ct_0)^2+(vt_0)^2=(\frac{1}{\gamma}ct_0)^2+(v_1t_0)^2+(v_2t_0)^2+(v_3t_0)^2 \quad (v=iv_1+jv_2+kv_3)$

It becomes, This is the basic line segment formula.

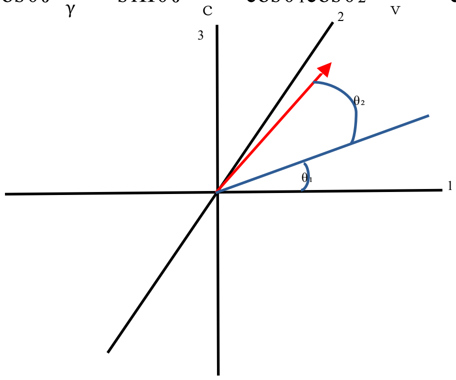
Furthermore, if you change the expression a little and make it trigonometric

$\lambda^2=(\lambda\cos\theta_0)^2+(\lambda\sin\theta_0)^2$

$=(\lambda\cos\theta_0)^2+(\lambda\sin\theta_0\cos\theta_1)^2+(\lambda\sin\theta_0\cos\theta_1\cos\theta_2)^2+(\lambda\sin\theta_0\sin\theta_1\sin\theta_2)^2$

($\lambda= (ct_0)^2$ $\gamma=\sqrt{1-\left(\frac{v}{c}\right)^2}$ θ_0:4 dimensional angle θ_1,θ_2:3 dimensional angle)

$\cos\theta_0=\frac{1}{\gamma}$ $\sin\theta_0=\frac{v}{c}$ $\cos\theta_1\cos\theta_2=\frac{v_1}{v}$ $\cos\theta_1\sin\theta_2=\frac{v_2}{v}$ $\sin\theta_1\sin\theta_2=\frac{v_3}{v}$



(θ_0 cannotbe described because it is in 4 dimensions)

Thus, the line segment formula follows the Pythagorean theorem.

However, it will have a Lorentz transformation property slightly different from the special relativity theory. When observing an object stopped at the stationary coordinate ct_0 from the velocity v, the line segment of motion becomes vt_0, which is the same as Newtonian mechanics, and the static momentum becomes $\frac{1}{\gamma}$ ct_0. In the another general relativity theory, the nature of coordinate transformation is different from that when the object is accelerated by applying energy, but this difference will be described later. From now on, this Lorentz transformation will be called another general relativity. Here, the basic line segment formula of another general relativity is modified slightly.

$(ct_0)^2=(\frac{1}{\gamma}ct_0)^2+(vt_0)^2 \rightarrow (\gamma ct_0)^2=(ct_0)^2+(\gamma vt_0)^2 \rightarrow (ct_0)^2=(\gamma ct_0)^2-(\gamma vt_0)^2$

It becomes, This is consistent with the conventional special relativity line segment formula. I will describe this line segment in the future.

3 Consideration of the speed of light of an object traveling at a speed close to the speed of light

In the previous section, I wrote the basic line segment formula of another general theory of relativity, but in this section I will discuss the theory based on the Lorenz transformation derivation method considered by Albert Einstein.

Let us consider the nature of light emitted toward an object traveling at a velocity V close to a certain speed of light.

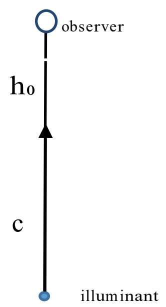


Figure 2-1 Emits light from the illuminant to the observer

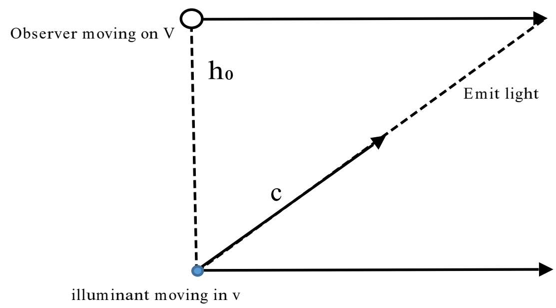


Figure 2-2 Light is emitted from a illuminant moving at v to an observer moving at the same speed

Figure 2-1 shows light emitted from a stationary object to a stationary observer. Figure 2-2 shows the phenomenon as seen from the coordinate axis of velocity v.

In the case of Fig. 2-1, if the observer's time is t_1

$(ct_1)^2=h_0^2$

The left side of the equation is the distance traveled by light, and h_0 is the shortest distance between the object and the observer. In Figure 2-2, the line segment formula is

$(\gamma ct_1)^2=(v\gamma t_1)^2+ h_0^2= (vt_2)^2+ h_0^2$

It becomes. Since these two phenomena are considered to be physically the same phenomenon, the line segments of light must coincide when Lorentz transformation is performed.

$$(ct_1)^2=(vt_1)^2+ \gamma^{-1}h_0^2=(vt_1)^2+\left(1-\left(\frac{v}{c}\right)^2\right)\left(ct_1\right)^2=(ct_1)^2$$

It becomes. In other words, the distance traveled by light does not change in either Figure 2-1 or Figure 2-2.

$(ct_1)^2=(\gamma ct_2)^2$

Therefore, in the special relativity is that the law of invariance of light speed is maintained. In other words, the moving object coordinates are contracted as a result of the movement, and the moving distance itself is stretched to maintain a universal light velocity.

Here we consider the motion of the same system based on the concept of another general relativity described in the previous chapter. When the line segment in Fig. 2-1 is written in another general relativity.

$(ct_1)^2 = h_0^2$

In another general theory of relativity, the space through which the light passes is extended rather than the object shrinks. Therefore, in the case of Figure 2-2, the path through which light passes is ct_2, so the shrinking ratio is

$$h_0^2 = (ct_2)^2 - (vt_2)^2 \qquad h_0 = \sqrt{c^2 - v^2}\ t_2 \qquad \frac{h_0}{ct_2} = \sqrt{1 - \left(\frac{v}{c}\right)^2} = \frac{1}{\gamma}$$

It becomes. At this time, if the ratio of the change of the light wave wavelength and the frequency is equal, the wave speed is constant.

$f_1 = \frac{1}{\gamma} f_2 \quad T_1 = \frac{1}{\gamma} T_2$ (f : Frequency T : Wavelength)

$$\frac{h_0}{ct_2} = \frac{1}{\gamma}\frac{h_0}{ct_1} = \sqrt{1 - \left(\frac{v}{c}\right)^2} = \frac{1}{\gamma} \qquad (ct_1)^2 = h_0^2$$

It becomes. The light speed invariance is maintained. This is the derivation that considered from the observation of light in another general theory of relativity. The expression on the left represents the progress of time, and the expression on the right represents the expansion of space. Considering the movement of this Lorentz transformation object, the path along which the light travels is considered as a stationary distance.

$(ct_0)^2 = (\frac{1}{\gamma} ct_0)^2 + (vt_0)^2 \rightarrow \lambda^2 = \lambda_0^2 + \lambda v^2$ (λ:4D distance λ_0:Rest distance λv:distance)

This is the basic line segment of the another general theory of relativity. Here I will describe another general relativistic Lorentz transformation of the line segment that has undergone Lorentz contraction in the special relativity. When Lorentz transformation of the moving body is performed and the relative speed is 0.

$(ct_0)^2 = (\gamma ct_0)^2 - (\gamma vt_0)^2$ (ct_0:Rest distance γct_0:4D distance γvt_0:3D distance

↓

$(\gamma ct_0)^2 = (ct_0)^2 + (\gamma vt_0)^2$ ($\gamma t_0 = t$ And put)→ $(ct)^2 = (ct_0)^2 + (vt)^2$

↓(Lorentz transformation with v)

$(ct)^2 = (\gamma ct_0)^2 \qquad \lambda^2 = \lambda^2$

Next, when the observer's coordinates are Lorentz transformed

$(ct_0)^2 = (ct_0)^2$

$(ct_0)^2 = (\gamma^{-1} ct_0)^2 + (-vt_0)^2$

The relationship between time t_0 and t

$t_0 = \gamma^{-1} t$

The Lorentz transformed line segment is converted further subjected to another Lorentz transformation. This transformation is different from the Lorentz inverse transformation of special relativity. In this transformation, humans who have undergone special relativistic Lorentz contraction, whose speed has increased as a result of energy being added from the outside, that are shrinking when viewed from the outside. And time is late. However, he recognizes that he is doing the same exercise. When observe from the perspective of a shrunken person, he recognizes that people in the outside world are extending and moving faster. This is different from Einstein's formula where the opponent appears to be contracting from either side. But Intuitively, the results are more consistent and the distance is consistent. In addition, when another Lorentz transformation is performed, only the space that is the light path expands and contracts, and the object does not contract. And this Lorentz transformation has a very advantageous property when explaining the twin paradox, which will be described later.

4 Velocity synthesis and momentum and energy in another general relativity.

In this section, I will describe the momentum and energy of general relativity. Up to the previous chapter, I have described the basic lines of another general theory of relativity, but in this section I will describe the composition of velocity, momentum and energy. The basic line of another general relativity is

$$(ct_0)^2=(\frac{1}{\gamma}ct_0)^2+(vt_0)^2 \quad \lambda^2=(\lambda\cos\theta_0)^2+(\lambda\sin\theta_0)^2$$

It is expressed. Naturally, since there is no Galilean transformation, velocity composition cannot be expressed as v_1+v_2. Here, we consider the velocity synthesis of special relativity. In special relativity, the composition of velocity is

$$\frac{v}{c} = \frac{\frac{v_1}{c}+\frac{v_2}{c}}{1+\frac{v_1v_2}{c^2}} \qquad \sinh\theta=\gamma v \qquad \cosh\theta=\gamma c \qquad \tanh\theta=\frac{v}{c}$$

Can be written. If $\tanh\theta_1$ is increased in phase by θ_2,

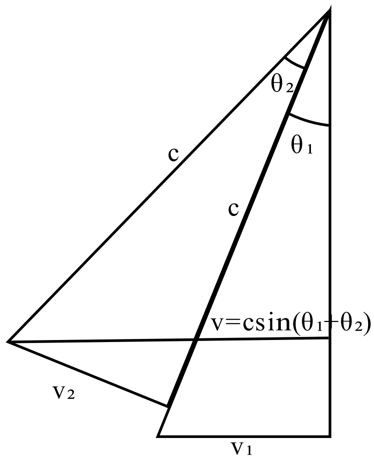
$$\frac{v}{c} = \tanh(\theta_1+\theta_2) = \frac{sinh(\theta_1+\theta_2)}{cosh(\theta_1+\theta_2)} = \frac{V_1c+v_2c}{c^2+v_1v_2} = \frac{\frac{v_1}{c}+\frac{v_2}{c}}{1+\frac{v_1v_2}{c^2}}$$

It becomes. In other words, velocity synthesis in the theory of relativity is the sum of phase angles. Based on this, we consider velocity synthesis in another general relativity. In another general theory of relativity, speed is expressed as $\sin\theta$.

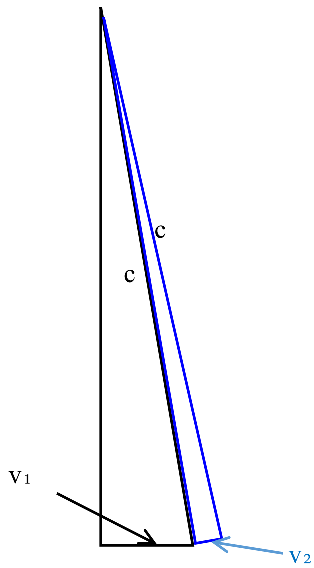
$$\frac{v}{c} = \sin(\theta_1+\theta_2) = \sin\theta_1\cos\theta_2+ \cos\theta_1\sin\theta_2$$

$$= \sqrt{1-\left(\frac{v_2}{c}\right)^2}\,\frac{v_1}{c} + \sqrt{1-\left(\frac{v_1}{c}\right)^2}\,\frac{v_2}{c}$$

Next. When the speed exceeds the speed of light, the equation becomes an imaginary solution. Next, the sum of the phase angles is shown in the figure.



Additive law of velocity



Speed conversion sufficiently slower than light speed

It becomes. In other words, it can be understood as geometry that the sum of speeds approximates a scalar sum at a speed sufficiently lower than the speed of light. Since the three-dimensional axis decomposition speed of light is considered as a normal speed, it is well understood that when the speed exceeds the speed of light, an imaginary solution is obtained. Next, let me describe the equation of momentum. It is the value that obtained by multiplying the static mass m_0 to the base line segment and dividing it by time t_0.

$$(m_0c)^2=(\frac{1}{\gamma}m_0c)^2+(m_0v)^2 \qquad p^2=p_0^2+pv^2$$

I would like to talk more about energy. One of the formulas for calculating energy in classical mechanics is that the force is integrated over the distance.

$$E=\int\frac{\partial p}{\partial t_0}d\lambda=\int\frac{\partial(m_0C)}{\partial t_0}d(ct_0)=\iint\frac{\partial(m_0C)}{\partial t_0}dt_0dc=m_0c^2$$

It is obtained by the calculation. This value is a little different from the special relativity, but it is essentially the same and will be discussed later. Also, the momentum equation $p_0^2+pv^2$ must be integrated at each distance, which will be described later.

5 Comparison with special relativity theory of energy conservation

In this section, we compare energy handling with special relativity. This time, instead of giving energy to the stopped object itself and accelerating it, the observer receives the energy and accelerates it, so that it becomes an object that moves at a velocity v. The energy of each stationary state is

$E_1=m_{01}c^2 \qquad E_2=m_{02}c^2$

It becomes, Lorentz transformation that makes speed v.

$$E_1=\frac{1}{\sqrt{1-\left(\frac{v_1}{c}\right)^2}}m_{01}c^2=\gamma_1 m_{01}c^2 \qquad E_2=\frac{1}{\sqrt{1-\left(\frac{v_2}{c}\right)^2}}m_{02}c^2=\gamma_2 m_{02}c^2$$

It becomes. I don't feel any doubt with this alone, but think about the energy difference between these two objects.

$$E_1-E_2=m_{01}c^2-m_{02}c^2\neq\frac{1}{\sqrt{1-\left(\frac{v_1}{c}\right)^2}}m_{01}c^2-\frac{1}{\sqrt{1-\left(\frac{v_2}{c}\right)^2}}m_{02}c^2$$

The law of conservation of energy does not hold. This calculation seems to be related to the paradox of two rockets. And Newtonian mechanics has the same properties. However, the Hamiltonian of early quantum mechanics assumes Newtonian mechanics, so when the observer's speed changes, it has the property that the intensity of the spectrum generated from the molecule changes. However, there is no problem if energy is given by accelerating molecules. And the coordinate transformation of the inertial system that does not give any energy from the outside is another general theory of relativity. In the case of general relativity, the total energy does not change due to Lorentz transformation, but changes while maintaining the relationship between static momentum and momentum. Therefore, the energy before acceleration is equal to the energy after acceleration.

$E_1-E_2=m_{01}c^2-m_{02}c^2$

The law of conservation of energy is maintained. This property makes the property when dealing with a distorted space simpler than Einstein's general theory of relativity.

6 A study of the twin paradox

The most famous paradox of special relativity is the twin paradox. Usually explained using the acceleration motion of Einstein's general theory of relativity, but in this section we explain using another general theory of relativity. When given that an object is accelerated by receiving energy from a stationary coordinate system, a special relativistic Lorentz transformation is used. If t_1 is observer time and t_2 is motor time,

$(ct_1)^2=(ct_1)^2$ (Lorentz conversion at speed v)$\rightarrow(\gamma ct_1)^2=(ct_1)^2+(\gamma vt_1)^2$ $(ct_2)^2=(ct_1)^2+(vt_2)^2$

In this case, the time t_2 of the moving body near the speed of light is delayed by $t_2 = \gamma t_1$. If this line segment is transformed into another Lorentz transformation

$(\gamma ct_1)^2=(\gamma ct_1)^2=(ct_2)^2$ $t_2=\gamma t_1$ $t_1=\gamma^{-1}t_2$

Another Lorentz transformation for the observer

$(ct_1)^2=(\gamma^{-1}ct_1)^2 + (vt_1)$

It becomes. In other words, the time of the moving body is delayed when viewed from the observer of the original stationary coordinates, and the observer time is advanced faster when viewed from the moving body. In other words, it can be considered that a physical phenomenon called a twin effect occurs rather than a twin paradox. The Lorentz transformation formula only for special relativity is also described.

$(ct_1)^2=(ct_1)^2$ (Lorentz conversion at speed v)$\rightarrow(\gamma ct_1)^2=(ct_1)^2+(\gamma vt_1)^2$ $(ct_2)^2=(ct_1)^2+(vt_2)^2$

Next, perform Lorentz inverse transformation

Moving body $(ct_2)^2=(ct_1)^2+(vt_2)^2$ $\rightarrow$ $(ct_2)^2=(ct_2)^2$ (The right side is static momentum)

Observer $(ct_2)^2=(ct_2)^2$ $\rightarrow$ $(\gamma ct_2)^2=(ct_2)^2+(\gamma vt_2)^2$ $t_1=\gamma t_2$

In order to make it easier to compare with another general relativity, it is not described in minkowski coordinates. In the case of the above equation, the time $t_1 = \gamma^{-1}t_2$ and $t_1 = \gamma t_2$ will exist at the same time. That's fine, but if you come back and forth, it's the twin paradox that you can observe that the opponent's time is delayed from the moving body and the stationary body at the same location. In order to solve the problem, we consider the time delay due to the general relativistic acceleration motion, but I am doubtful that the problem can be solved under all conditions. On the other hand, in another general relativity theory, it can be considered that only the time of an object accelerated by applying energy is delayed, so that only an event confirmed in an experiment called a twin effect occurs. In other words, when a human whose time is late is observed by a human whose time not slow, the natural result is that the human appears to move quickly.

7 Mathematics needed to represent a distorted 3D space

I've described another general theory of relativity in a line segment until the previous section, but in the future I will describe another general theory of relativity in a distorted three-dimensional space. Before that, I will talk about the mathematics necessary for it.

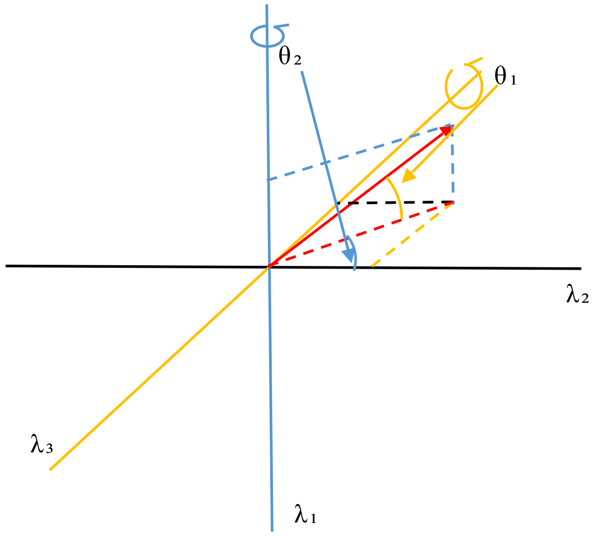
7—1 4D coordinate system

I talked a little about the 4th dimension in section 1, but I'll summarize it. First, suppose that a vector λ in which a scalar quantity that can be placed in normal geometry does not change is represented by a two-dimensional coordinate display.

$\lambda^2=\lambda_1^2+\lambda_2^2=(\lambda\cos\theta_1)^2+(\lambda\sin\theta_1)^2$

Furthermore, when expressed in 3D coordinate display

$\lambda^2=\lambda_1^2+\lambda_2^2+\lambda_3^2=(\lambda\cos\theta_1)^2+(\lambda\sin\theta_1\cos\theta_2)^2+(\lambda\sin\theta_1\sin\theta_2)^2$



It becomes. Explaining this equation, it can be considered that a certain dimension is decomposed into a new dimension at an angle θ, and a new dimension is created when a certain coordinate is decomposed with a trigonometric function. Therefore, if the vector is decomposed to 4 dimensions.

$\lambda^2=\lambda_0^2+\lambda_1^2+\lambda_2^2=(\lambda\cos\theta_0)^2+(\lambda\sin\theta_0\cos\theta_1)^2+(\lambda\sin\theta_0\sin\theta_1)^2$

$\lambda^2=\lambda_0^2+\lambda_1^2+\lambda_2^2+\lambda_3^2=(\lambda\cos\theta_0)^2+(\lambda\sin\theta_0\cos\theta_1)^2+(\lambda\sin\theta_0\sin\theta_1\cos\theta_2)^2+(\lambda\sin\theta_0\sin\theta_1\sin\theta_2)^2$

In the case of this coordinate system, θ is rotated by the rule of adding a new coordinate system to the sin θ axis, and thus a multidimensional coordinate can be defined. In the future, we will develop the theory based on this coordinate system.

Next, we will discuss complex numbers and differential operators. Expressing the above coordinates in vector notation

$\lambda=i\lambda_0+j\lambda_1+k\lambda_2+l\lambda_3$

First, consider only the two-dimensional complex plane.

$\lambda=\lambda_0+i\lambda_1=\lambda\sin\theta_0+i\lambda\cos\theta_0$

Here, by multiplying both sides by i, the phase of this vector can be advanced by 90 degrees.

Here we use the differential operator $\frac{\partial f}{\partial\theta_0}$ instead of i.

$\lambda(\lambda_0、\frac{\partial\lambda_0}{\partial\theta_0}) = \lambda(\lambda\sin\theta_0、\lambda\cos\theta_0)$

Differentiate with differential operators

$\frac{\partial\lambda}{\partial\theta_0} = \lambda(\lambda\cos\theta_0、-\lambda\sin\theta_0)$ $\frac{\partial\lambda^2}{\partial^2\theta_0} = \lambda(--\lambda\sin\theta_0、--\lambda\cos\theta_0)$ $\frac{\partial\lambda^3}{\partial^3\theta_0} = \lambda(--\lambda\cos\theta_0、\lambda\sin\theta_0)$

$\frac{\partial\lambda^4}{\partial^4\theta_0} = \lambda(\lambda\sin\theta_0、\lambda\cos\theta_0) = \lambda$

Be like. This is exactly the same as the complex plane vector when multiplied by an imaginary number.

In other words, a two-dimensional coordinate system whose scalar quantity does not change can be expressed using the differential operator Dθ with respect to θ instead of complex numbers.The formula is

$\lambda(\lambda_0、\lambda v) = \lambda(\lambda_0、D_0\lambda_0)$ If the phase angle is advanced 90 degrees → $D_0\lambda(\lambda_0、D_0\lambda_0)$

Can be written as follows. It is not perfect because it has not been mathematically proved like Euler's formula, but such a representation is possible. Each phase angle has the basic formula

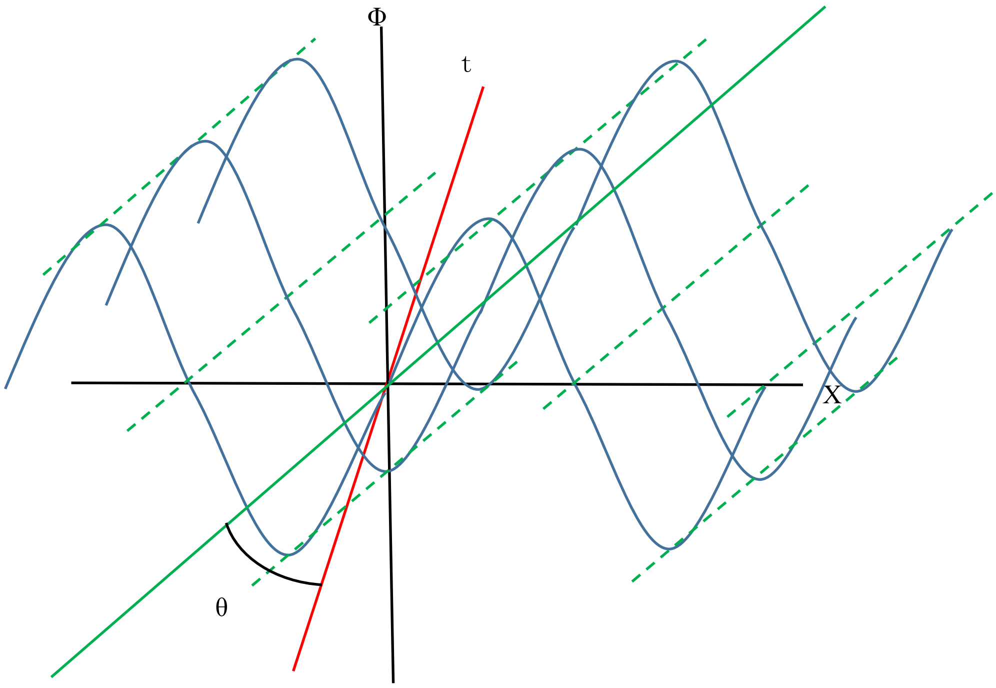
$\lambda(\lambda_0、\lambda_1、\lambda_2、\lambda_3) = \lambda(\lambda\cos\theta_0、\lambda\sin\theta_0\cos\theta_1、\lambda\sin\theta_0\sin\theta_1\cos\theta_2、\lambda\sin\theta_0\sin\theta_1\sin\theta_2)$

Therefore, it has the property that it can be rotated 90 degrees at the angle defined first by partial differentiation with θ_0, θ_1, and θ_2. This is a more advantageous property than the complex plane that can represent only two dimensions, and it will become a four-dimensional basic expression method that will be useful in the future.

7—2　Wave equation

This section describes the wave equation necessary for another general relativity. There is a formula of $\frac{\partial^2\Phi}{\partial x^2} = \frac{1}{c^2}\frac{\partial^2\Phi}{\partial t_0}$ as a basic form of the current wave equation, but let me describe another wave equation.　First, consider the properties of a coordinate system in which something similar to a wave is transmitted at a wave velocity c.

The property is thought to be such that a certain inclination ∂Φ/∂x advances at a wave velocity c in the coordinate system. To illustrate with a sine wave.



It becomes such a figure. In this figure, X is the distance, Φ is the potential, and t is the time axis. It can be seen from this figure that when the function of the wave position is differentiated with respect to the coordinate axis of the green dotted line, it becomes zero.

Φ(x、t)coordinate axis　(Convert)→Φ(α、β)=Φ($\sqrt{x^2+t^2}$ cosθ、$\sqrt{x^2+t^2}$ sinθ)

$$\frac{\partial\Phi}{\partial\alpha} = 0$$

It can be expressed in the expression.

Next find the general solution of this wave equation. If an arbitrary coordinate is (x, t) and it is displayed in polar coordinates.

$$\Phi(\sqrt{x^2+t^2}\ cos(tan^{-1}\frac{t}{x})、\sqrt{x^2+t^2}\ sin(tan^{-1}\frac{t}{x}))$$

The phase angle is converted to the green dotted line coordinates.

$\Phi(\sqrt{x^2+t^2}\ cos(tan^{-1}\frac{t}{x}\ -\ tan^{-1}\frac{1}{c})、\sqrt{x^2+t^2}\ sin(tan^{-1}\frac{t}{x}\ - tan^{-1}\frac{1}{c}))$

$=\Phi(\alpha、\beta)$

From this, the partial differential equation is obtained. Since Φ (α, β) is partially differentiated by α, the solution is

$A\Phi(\beta)=A\Phi(\sqrt{x^2+t^2}\ sin(tan^{-1}\frac{t}{x}\ - tan^{-1}\frac{1}{c}))$ A : constant

It becomes. Next, it decomposes with the addition theorem.

$A\Phi(\sqrt{x^2+t^2}\ sin(tan^{-1}\frac{t}{x}\ - tan^{-1}\frac{1}{c}))$

$= A\sqrt{x^2+t^2}\Phi(sin(tan^{-1}\frac{t}{x})cos(tan^{-1}\frac{1}{c})\ -\sin\ (tan^{-1}\frac{1}{c})\cos(tan^{-1}\frac{t}{x}))$

$= A\sqrt{x^2+t^2}\Phi\left(\frac{t}{\sqrt{x^2+t^2}}\frac{c}{\sqrt{1+c^2}}\ -\ \frac{x}{\sqrt{x^2+t^2}}\frac{1}{\sqrt{1+c^2}}\right)$

$=\frac{-A}{\sqrt{1+c^2}}\Phi(x-ct)$

Becomes one of several general solution, which is in the form of a wave equation. This equation is superior to the conventional wave equation a little, and has the property that the change in frequency is not transmitted at an infinite speed even in a wave where the vibration frequency changes at the point of x = 0. And even if it is not a periodic function, the equation may hold.

Next, I will try to find a simple function solution using this general solution. The solution is

$\Phi(x、t)=\sin\left(2\pi\left(\frac{x}{\lambda}-\frac{c}{\lambda}t\right)\right)$ Let's solve the function to be a general solution.

$\Phi(0、t)=\sin(\omega t)$ Is the initial condition and the wave speed is c, the general solution is

$\Phi(x、t) = -A\Phi(x - ct)$

$\Phi(0、t') = \Phi(t') = -A\Phi(-ct') = \sin(\omega t')$ $-ct' = x- ct$

$-{-A}\Phi(x - ct) = \sin\omega\left(-\frac{x}{c}+t\right) = \sin 2\pi\left(-\frac{x}{\lambda}+\frac{ct}{\lambda}\right)$

$\Phi(x、t) = \sin 2\pi\left(\frac{x}{\lambda}-\frac{ct}{\lambda}\right)$ Is the solution

The new wave equation looks like this, and we will use it later in another general theory of relativity that represents a distorted space.

7-3 Calculation of the surface volume of a 4D sphere

Here, the surface volume of a four-dimensional sphere will be calculated using the four-dimensional coordinate system described in 7-1. The circumference of the circle is $2\pi r$, and the surface area of the sphere is $4\pi r^2$. If this is calculated in polar coordinates.

$$Ly = \int_0^{2\pi} r d\theta y = 2\pi r \qquad \frac{\partial Lx}{\partial \theta x} = r$$

It becomes. If you think about rotating around the x axis with Lx.

$$\frac{\partial Lx}{\partial \theta x} = r\sin\theta x$$

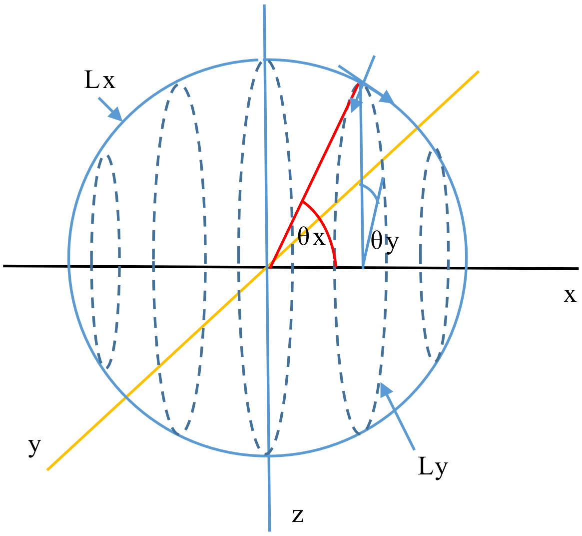
In other words, the small surface area of a sphere at a certain point is

$$\frac{\partial Ly}{\partial \theta y}\frac{\partial Lx}{\partial \theta x} = \frac{\partial^2 S}{\partial \theta y \partial \theta x} = r^2\sin\theta x$$

It becomes. Integrating this

$$S = \iint_0^{2\pi} r^2 \sin\theta y \; d\theta y \, d\theta x = 4\pi r^2$$

It becomes. As shown in the figure



Multiply by the length per unit angle in the Lx direction and the length per unit angle in the Ly direction, and integrate each. If this formula is extended to 4 dimensions as it is

$$\frac{\partial Lz}{\partial \theta z} = r\sin\theta x \sin\theta y$$

Since there should be a circle rotating around the Z axis, the above equation is obtained. Therefore, as before, the minute surface volume of a point on the 4D sphere is

$$\frac{\partial^3 V}{\partial \theta x \partial \theta y \partial \theta z} = \frac{\partial Lx}{\partial \theta x}\frac{\partial Ly}{\partial \theta y}\frac{\partial Lz}{\partial \theta z} = r^3\sin^2\theta x \, \sin\theta y \qquad \int_0^{\pi}\int_0^{\pi}\int_0^{2\pi} r^3 \sin^2\theta x \sin\theta y \; d\theta z \, d\theta y \, d\theta x = 4\pi^2 r^3$$

Then the value of the surface volume of the 4D sphere is $4\pi^2 r^3$.

8 Geodesic equations and Newtonian mechanics

From this section, I will express the distorted 3D space in 4D. When expressing the theory of relativity, the object is calculated as passing through a minimum distance (maximum distance) between two distant points. There is a Christoffel symbol that becomes the equation, but let's consider the geodesic equation from another point of view.

By the same token, I consider it passes through a space that fills a minute surface volume, not the shortest distance between two points. Here, it is assumed that there is a minimal area that can be expressed by $dS = d\lambda_2 \times d\lambda_2$, and this minimal area moves in the direction of $d\lambda$. Then.

$$\frac{dV}{d\lambda} = d\lambda_1 \times d\lambda_2 \qquad \frac{\partial^2 V}{\partial\lambda_1 \partial\lambda_2} = d\lambda$$

It becomes. Next, there is a potential W close to the density in space, and considering its volume integral,

$$\frac{\partial V}{\partial\lambda} = \frac{\partial W}{\partial\lambda_1} \times \frac{\partial W}{\partial\lambda_2} \times \frac{\partial W}{\partial\lambda}$$

The differential equation is as follows. A line segment in which this differential equation takes a minimum value or a infinitesimal value with respect to a minute displacement λ is considered a geodesic line. Then

$\frac{\partial V}{\partial\lambda} = 0$ However $\frac{\partial^2 V}{\partial\lambda^2} \geq 0$ At the time of $\frac{\partial V}{\partial\lambda} = 0$ When there is one solution

The minimum value will be taken. Then

$$\frac{\partial V}{\partial\lambda} = \frac{\partial W}{\partial\lambda_1} \times \frac{\partial W}{\partial\lambda_2} \times \frac{\partial W}{\partial\lambda} = 0$$

Is the minimum surface volume. Further $\frac{\partial W}{\partial\lambda} = F$、$\frac{\partial W}{\partial\lambda_1} = F_1$、$\frac{\partial W}{\partial\lambda_2} = F_2$、If in case

$$\frac{\partial V}{\partial\lambda} = \frac{\partial W}{\partial\lambda_1} \times \frac{\partial W}{\partial\lambda_2} \times \frac{\partial W}{\partial\lambda} = F_1 \times F_2 \times F = 0$$

$F_1=0 \quad F_2=0 \quad F=0$

This is the law of inertia of Newtonian mechanics. However, in this equation, if any one of the forces of each coordinate becomes 0, the geodesic curve is satisfied. However, because λ, λ_1, and λ_2 are linearly independent

$$\left(\frac{\partial W}{\partial\lambda}\right) + \left(\frac{\partial W}{\partial\lambda_1}\right) + \left(\frac{\partial W}{\partial\lambda_2}\right) = 0$$

All terms must be zero to satisfy the relation. So Newtonian geodesic equation is

$$\frac{\partial V}{\partial\lambda} = \frac{\partial W}{\partial\lambda_1} \times \frac{\partial W}{\partial\lambda_2} \times \frac{\partial W}{\partial\lambda} = F_1 \times F_2 \times F = 0$$

And something like this.

Here the law of gravitation is $Fq = G\frac{m_0 m_1}{r^2}$ The reaction of movement is $Fv = m_1\frac{dv}{dt}$ so

$$\dot{F}q - \dot{F}v = 0$$

Becomes the geodesic equation in the Newtonian force field, which is Lagrangian in Newtonian mechanics. However, in this formula, Fv works as a reaction pulled by gravity, but in reality we cannot feel such a force. In order to solve such problems, it is considered necessary to reconstruct the theory of gravitational field as the theory of relativity.

9 Another general relativity theory in distorted three-dimensional space

In the previous section, Newtonian mechanics was expressed by a geodesic equation considering the surface volume, and this is applied to another general relativity theory. According to the equivalence principle of relativity, acceleration by gravity is considered to be inertial motion. Albert Einstein wanted to advance the ideal in the process of constructing general relativity, but he defined the Einstein tensor due to the violation of the energy conservation law. The reason why, the acceleration of special relativity is a physical phenomenon in which energy is received from outside and accelerated. Therefore, the Einstein tensor kept the law of conservation of energy by subtracting tensor of $\frac{1}{2}$ centrifugal forces. However, the acceleration of another general relativity has the property that the total energy does not change. Therefore, a tensor that expresses centrifugal force is not necessary. In addition, since all objects are moving at the speed of light, the object cannot be moved to all places in the four-dimensional space, but can be considered to be movable only to the three-dimensional space distorted in the fourth direction.

Here, we use the 4D geometry described in Section 7 instead of the Riemannian geometry to represent a distorted 3D space. The basic line equation of another general relativity is

$$(ct_0)^2=(\frac{1}{\gamma}ct_0)^2+(vt_0)^2=(\frac{1}{\gamma}ct_0)^2+(v_1t_0)^2+(v_2t_0)^2+(v_3t_0)^2$$

It becomes. When this line segment is expressed by a differential equation,

$$\left(\frac{\partial\lambda}{\partial\lambda}\right)^2=\left(\frac{\partial\lambda p_0}{\partial\lambda}\right)^2+\left(\frac{\partial\lambda pv}{\partial\lambda}\right)^2 \rightarrow \quad 1^2=(\gamma^{-1})^2+(\frac{v}{c})^2$$

It becomes. Multiplying a stationary mass m_0 to both sides

$$\left(m_0\frac{\partial\lambda}{\partial\lambda}\right)^2=\left(m_0\frac{\partial\lambda p_0}{\partial\lambda}\right)^2+\left(m_0\frac{\partial\lambda pv}{\partial\lambda}\right)^2 \rightarrow (m_0c)^2=(\gamma^{-1}m_0c)^2+(m_0v)^2$$

$$P^2=p_0^2+pv^2=p_0^2+p_1^2+p_2^2+p_3^2$$

It becomes such a thing, and it becomes a conservation law of momentum. Here, considering a point-symmetric inverse square field, the motions in question are only the velocity vl perpendicular to the radius r and the velocity vr in the same direction as r.

$$\left(\frac{\partial\lambda}{\partial\lambda}\right)^2=\left(\frac{\partial\lambda q_0}{\partial\lambda}\right)^2+\left(\frac{\partial\lambda qvr}{\partial\lambda}\right)^2+\left(\frac{\partial\lambda qvl}{\partial\lambda}\right)^2$$

For the sake of simplicity, we will consider it as a free fall motion with qvl = 0. The universal gravitation law in Newtonian mechanics is expressed by eliminating the mass of the moving object.

$$\frac{\partial^2\lambda qvr}{\partial\lambda^2}=\frac{1}{C^2}\frac{Gm}{r^2} \qquad \lambda = ct_0$$

It becomes. This can be regarded as a distribution of $\frac{\partial^2 \lambda qvr}{\partial \lambda^2}$ as a function of position in space.

In other words, this curvature is expressed as a change in the speed of another general theory of relativity, think of it as inertial motion, and build an equation. This is exactly the same idea as Einstein's general theory of relativity. When formula

$\frac{\partial^2 \lambda qvr}{\partial \lambda^2} = \frac{\partial}{\partial \lambda}\left(\frac{\partial \lambda qvr}{\partial \lambda}\right)$ The equation of the moving object is $\left(\frac{\partial \lambda}{\partial \lambda}\right)^2 = \left(\frac{\partial \lambda p_0}{\partial \lambda}\right)^2 + \left(\frac{\partial \lambda pvr}{\partial \lambda}\right)^2$

In terms of trigonometric functions

$$\frac{\partial}{\partial \lambda}\left(\frac{\partial \lambda qvr}{\partial \lambda}\right) = \frac{\partial}{\partial \lambda}\left(sin\theta q(\lambda) \right) \quad \frac{\partial}{\partial \lambda}\left(\frac{\partial \lambda q_0}{\partial \lambda}\right) = \frac{\partial}{\partial \lambda}\left(cos\theta q(\lambda) \right) \qquad \left(\frac{\partial \lambda}{\partial \lambda}\right)^2 = cos^2\theta p + sin^2\theta p$$

(θq:Angle of space curvature θp:Angle of initial velocity)

Considering that the line segment of initial velocity θp changes by θq as λ advances

$$\left(\frac{\partial \lambda}{\partial \lambda}\right)^2 = cos^2(\theta p - \theta q) + sin^2(\theta p - \theta q)$$

It becomes an expression like this. The remaining dimension qvl is considered to change following the momentum conservation law. If you take it apart again

$$sin(\theta p - \theta q) = \sin\theta p\cos\theta q - \cos\theta p\sin\theta q = \frac{v}{c}\frac{\partial \lambda q_0}{\partial \lambda} - \sqrt{1-\left(\frac{v}{c}\right)^2}\frac{\partial \lambda qvr}{\partial \lambda}$$

This speed change occurs when λ light years advance. In other words, the speed change after λ light years is

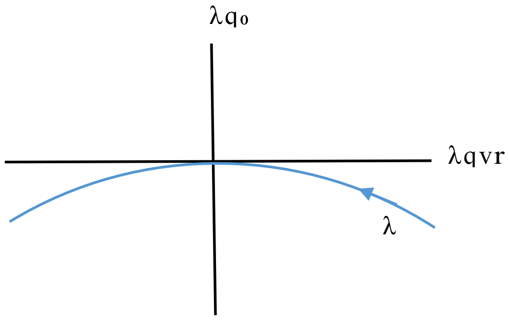
$$\int \frac{\partial^2 \lambda qvr}{\partial \lambda^2} d\lambda = \frac{\partial \lambda qvr}{\partial \lambda} = \sin\theta q(\lambda) = \beta(\lambda vr)$$

Considering the distance r from the center of the law of gravitation as the three-dimensional distance λqvr, the velocity function β (λvr) is

$$\int \frac{\partial^2 \lambda vr}{\partial \lambda^2} d\lambda vr = \int \frac{\partial \beta}{\partial \lambda} d\lambda\, vr = \int \frac{\partial \beta}{\partial \lambda vr}\frac{\partial \lambda vr}{\partial \lambda} d\lambda\, vr = \int \beta\, d\beta = \frac{1}{2}\beta^2$$

$$\int \frac{\partial \beta}{\partial \lambda} d\lambda\, vr = \int_{\lambda vr_2}^{\lambda vr_1} \frac{1\ \mathrm{GM}}{\mathrm{C}^2 \lambda vr^2} d\lambda\, vr = \left[\frac{1\ \mathrm{GM}}{\mathrm{C}^2 \lambda vr}\right]_{\lambda vr_2}^{\lambda vr_1}$$

$$\beta(\lambda \mathrm{vr}) = \sqrt{\left[\frac{2\ \mathrm{GM}}{\mathrm{C}^2 \lambda vr}\right]_{\lambda vr_2}^{\lambda vr_1}}$$



it is conceivable that. In other words, the object is moving at a constant speed, but the coordinates are changing, so it just looks like it is accelerating. If we extend the geodesic equation in the previous section to 4 dimensions

$$\frac{\partial V}{\partial \lambda} = \frac{\partial W}{\partial \lambda_0}\times\frac{\partial W}{\partial \lambda_1}\times\frac{\partial W}{\partial \lambda_2}\times\frac{\partial W}{\partial \lambda_3} = 0 \quad Fn = 0\ (n = 0,1,2,3)$$

$$\left(\frac{\partial \lambda}{\partial \lambda}\right)^2 = \left(\frac{\partial \lambda_0}{\partial \lambda}\right)^2 + \left(\frac{\partial \lambda_1}{\partial \lambda}\right)^2 + \left(\frac{\partial \lambda_2}{\partial \lambda}\right)^2 + \left(\frac{\partial \lambda_3}{\partial \lambda}\right)^2$$

And expressed in momentum

$$\frac{Fn}{c} = \frac{\partial pn}{\partial \lambda} = 0 \quad (n = 0,1,2,3)$$

A line segment that satisfies this is considered a geodesic line. Simplify the problem and solve an equation with only p_0 and pv.

$$\frac{F}{C} = \frac{\partial p}{\partial (ct_0)} = \frac{\partial (m_0 c)}{\partial \lambda} = 0$$ (The force in the direction of advance is always 0 for another general theory of relativity.)

$$\frac{F_0}{C} = \frac{\partial p_0}{\partial (ct_0)} = \frac{\partial (\gamma^{-1} m_0 c)}{\partial \lambda} = m_0\frac{\partial (\cos\theta)}{\partial t_0} = -m_0\sin\theta\frac{\partial (\theta)}{\partial t_0} = 0$$

$$\frac{Fv}{C} = \frac{\partial pv}{\partial (ct_0)} = \frac{\partial (m_0 v)}{\partial \lambda} = \frac{1}{C}\, m_0\frac{\partial v}{\partial t_0}\ \text{(Second law of motion)} = m_0\frac{\partial (\sin\theta)}{\partial t_0} = m_0\cos\theta\frac{\partial \theta}{\partial t_0} = 0$$

It is thought that the geodesic line has a relationship. Considering geodesic conditions with respect to Fv here, if the stationary mass is 0, it will be satisfied naturally, if the stationary speed is unchanged, it will be satisfied, but this time it is not applied. Therefore, it is considered that the geodesic curve satisfies $\frac{\partial \theta}{\partial t_0}=0$. As I wrote a while ago, in another general theory of relativity, the angle $\Delta\theta$ of apparent acceleration motion is

$\Delta\theta = \theta p - \theta q$ (θq:Angle of space curvature θp:Initial speed angle)

Therefore, the geodesic condition is that $\Delta\theta$ is always constant with respect to the four-dimensional distance. When solved

$\frac{F_0}{C} = \frac{\partial p_0}{\partial(ct_0)} = -m_0 \sin\Delta\theta \frac{\partial(\Delta\theta)}{\partial t_0} = -m_0 \frac{\partial(\Delta\theta)}{\partial t_0} \left(sin\theta p cos\theta q - cos\theta p sin\theta q \right)$

$= -m_0 \frac{\partial(\Delta\theta)}{\partial t_0} \left(pq' - qp' \right) = 0 \quad \rightarrow \quad m = 0 \quad pq' - qp' = 0$

$\frac{Fv}{C} = \frac{\partial pv}{\partial(ct_0)} = m_0 \cos\theta \frac{\partial\theta}{\partial t_0} = m_0 \frac{\partial(\Delta\theta)}{\partial t_0} (\cos\theta p \cos\theta q + \sin\theta p \sin\theta q)$

$= -m_0 \frac{\partial(\Delta\theta)}{\partial t_0} \left(p'q' + qp \right) = 0 \quad \rightarrow \quad m = 0 \quad p'q' + qp = 0$

($p = \sin\theta p \qquad q = \sin\theta q$)

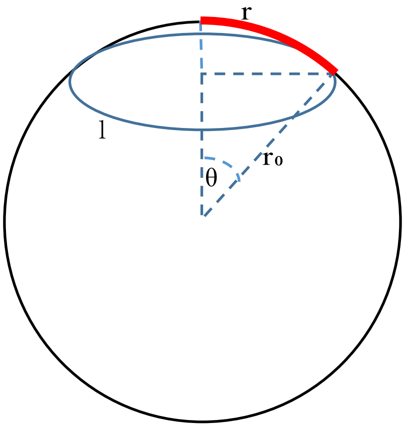
As a result, the condition of another general relativity geodesic line is very similar to the previous quantum mechanics.

10 Another general theory of relativity in Newton force fields.

In the previous section, we calculated the geodesic conditions of another general relativity where the field shape is not concrete. In this section, we apply the universal gravitational force field and calculate that the results are almost the same as Newtonian mechanics. In the previous section, the law of universal gravitation was set to $\frac{\partial^2 \lambda qvr}{\partial \lambda^2} = \frac{1}{C^2} \frac{Gm}{\lambda vr^2}$. If you rewrite it a little bit

$\frac{\partial^2 \lambda qvr}{\partial \lambda^2} = \frac{4\pi}{C^2} \frac{Gm}{4\pi\lambda vr^2} = \frac{4\pi}{C^2} \frac{Gm}{S}$ (S:Surface area of a sphere of radius λvr)

It becomes. If this property represents the surface area of a sphere, not a coincidence. Since the radius is set to a four-dimensional distance, the circumference ratio does not become π. Therefore, this world is forcibly considered as a spherical shape, and the circumference is corrected. Considering this world as the surface volume of a four-dimensional sphere, considering all energy can be emitted only in the three-dimensional direction and not diverging in the four-dimensional direction



Naturally, the surface area of a point with a four-dimensional distance r is not $4\pi r^2$, but a smaller value, and the π is not constant. However, according to the figure above, for π and π'

$$l = 2\pi r_0 \sin\theta \quad l = 2\pi' r = 2\pi'(r_0\theta)$$

$$\therefore 2\pi r_0 \sin\theta = 2\pi'(r_0\theta)$$

$$\pi' = \frac{\sin\theta}{\theta}\pi$$

It can be seen that there is a relationship. The question is what kind of field is created by the stationary mass, but now we will continue to consider similar fields according to the law of gravitation. Also, since the universe is considered sufficiently large, we will consider it as $\pi' \approx \pi$. Assuming that the velocity function β (λvr) is superposed on the curvature of the center mass Mq and the mass Mp of the moving body as calculated in the previous section.

$$\frac{\partial\beta}{\partial\lambda} = \frac{G}{C^2}\frac{(M_q+M_p)}{\lambda vr^2} \qquad \beta(\lambda vr) = \sqrt{\left[\frac{2}{C^2}\frac{G(M_q+M_p)}{\lambda vr}\right]_{\lambda vr_2}^{\lambda vr_1}}$$

Then, for the time being, we will continue our discussion with this spatial curvature. Suppose that the space is curved by the mass of the center sun and the mass of the moving body, and that the superposition principle holds.

$$\frac{\partial^2\lambda qvr}{\partial\lambda^2} = \frac{G}{C^2}\frac{(M_q+M_p)}{\lambda vr^2} \rightarrow \frac{\partial\lambda qvr}{\partial\lambda} = \sqrt{\left[\frac{2}{C^2}\frac{G(M_q+M_p)}{\lambda vr}\right]_{\lambda vr_2}^{\lambda vr_1}} \quad \frac{\partial\lambda q_0}{\partial\lambda} = \sqrt{1-\left[\frac{2}{C^2}\frac{G(M_q+M_p)}{\lambda vr}\right]_{\lambda vr_2}^{\lambda vr_1}}$$

It becomes a line segment of space like(There is no base value, which is expressed only by the change in position velocity with respect to the distance from the start of the moving body.). As shown in the previous section, geodesic conditions are

$$\frac{\partial W}{\partial\lambda_0}\times\frac{\partial W}{\partial\lambda vr}\times\frac{\partial W}{\partial\lambda vl}\times\frac{\partial W}{\partial\lambda} = 0 \qquad Fn = 0\ (n=0,vr=1,vl=2)$$

$$p'q'+qp = 0$$

$$pq'-qp' = 0$$

(p:move momentum of sinθp p′: $\frac{\partial p}{\partial \theta}$ is the cosθp of the move momentum)

(q:The center space momentum, sinθq q′:$\frac{\partial q}{\partial \theta}$ is the center space momentum of cosθq)

$$\cos(\theta p-\theta q)= p'q'+qp = \frac{\partial \lambda p_0}{\partial \lambda}\sqrt{1-\left[\frac{2}{C^2}\,\frac{G(M_q+M_p)}{\lambda vr}\right]_{\lambda vr_2}^{\lambda vr_1}} + \sqrt{\left[\frac{2}{C^2}\,\frac{G(M_q+M_p)}{\lambda vr}\right]_{\lambda vr_2}^{\lambda vr_1}}\,\frac{\partial \lambda p_1}{\partial \lambda}= 0$$

$$\sin(\theta p-\theta q)= pq'-qp'= \frac{\partial \lambda p_1}{\partial \lambda}\sqrt{1-\left[\frac{2}{C^2}\,\frac{G(M_q+M_p)}{\lambda vr}\right]_{\lambda vr_2}^{\lambda vr_1}} - \sqrt{\left[\frac{2}{C^2}\,\frac{G(M_q+M_p)}{\lambda vr}\right]_{\lambda vr_2}^{\lambda vr_1}}\,\frac{\partial \lambda p_0}{\partial \lambda}= 0$$

It becomes a formula like, calculate $\frac{\partial \beta}{\partial \lambda}$ as Lagrangian

$$\frac{\partial\,(\,sin(\theta p-\theta q)\,)}{\partial \lambda} = \frac{\partial^2 \lambda p_1}{\partial \lambda^2}\sqrt{1-\left[\frac{2}{C^2}\,\frac{G(M_q+M_p)}{\lambda vr}\right]_{\lambda vr_2}^{\lambda vr_1}} + \frac{\partial \lambda p_1}{\partial \lambda}\,\frac{\partial}{\partial \lambda}\left(\sqrt{1-\left[\frac{2}{C^2}\,\frac{G(M_q+M_p)}{\lambda vr}\right]_{\lambda vr_2}^{\lambda vr_1}}\right)$$

$$-\frac{\partial}{\partial \lambda}\left(\sqrt{\left[\frac{2}{C^2}\,\frac{G(M_q+M_p)}{\lambda vr}\right]_{\lambda vr_2}^{\lambda vr_1}}\right)\frac{\partial \lambda p_0}{\partial \lambda} - \sqrt{\left[\frac{2}{C^2}\,\frac{G(M_q+M_p)}{\lambda vr}\right]_{\lambda vr_2}^{\lambda vr_1}}\,\frac{\partial^2 \lambda p_0}{\partial \lambda^2}$$

$\cos\theta q = \sqrt{1-\left[\frac{2}{C^2}\,\frac{G(M_q+M_p)}{\lambda vr}\right]_{\lambda vr_2}^{\lambda vr_1}}$ $\sin\theta q = \sqrt{\left[\frac{2}{C^2}\,\frac{G(M_q+M_p)}{\lambda vr}\right]_{\lambda vr_2}^{\lambda vr_1}}$ And put

$$\frac{\partial^2 \lambda_1}{\partial \lambda^2} = \frac{\partial^2 \lambda p_1}{\partial \lambda^2}\cos\theta q+\frac{\partial \lambda p_1}{\partial \lambda}\,\frac{\partial}{\partial \lambda}(cos\theta q) - \frac{\partial}{\partial \lambda}\left(\,sin\theta q\,\right)\frac{\partial \lambda p_0}{\partial \lambda} - sin\theta q\,\frac{\partial^2 \lambda p_0}{\partial \lambda^2} \quad \text{---①}$$

Here we calculate the center space momentum

$\frac{\partial}{\partial \lambda}(cos\theta q) = -\sin\theta q\frac{\partial \theta q}{\partial \lambda}$ $\theta q = \sin^{-1}\beta q$ And put

$$\frac{\partial \theta q}{\partial \lambda}= \frac{\partial \theta q}{\partial \beta q}\,\frac{\partial \beta q}{\partial \lambda}=\frac{1}{\sqrt{1-\beta q^2}}\left(-\frac{G}{C^2}\,\frac{(M_q+M_p)}{\lambda vr^2}\right)$$

$$\frac{\partial}{\partial \lambda}(cos\theta q) = -\sin\theta q\frac{\partial \theta q}{\partial \lambda} =\frac{\beta q}{\sqrt{1-\beta q^2}}\left(\frac{G}{C^2}\,\frac{(M_q+M_p)}{\lambda vr^2}\right) \quad \text{---②}$$

Also

$$\frac{\partial}{\partial \lambda}(sin\theta q) = \cos\theta q\frac{\partial \theta q}{\partial \lambda} = \cos\theta q\frac{\partial}{\partial \beta q}(sin^{-1}\beta q)\frac{\partial \beta q}{\partial \lambda}$$

$$= \cos\theta q\frac{1}{\sqrt{1-\beta q^2}}\left(-\frac{G}{C^2}\,\frac{(M_q+M_p)}{\lambda vr^2}\right) = \left(-\frac{G}{C^2}\,\frac{(M_q+M_p)}{\lambda vr^2}\right) \quad \text{----③}$$

Next, calculate the move substance motion

$\frac{\partial \lambda p_1}{\partial \lambda}= sin\theta p = \beta p$ And put

$$\frac{\partial^2 \lambda p_1}{\partial \lambda^2}=\frac{\partial}{\partial \lambda}(sin\theta p)= \cos\theta p\frac{\partial \theta p}{\partial \lambda} = \cos\theta p\frac{\partial}{\partial \beta p}(sin^{-1}\beta p)\frac{\partial \beta p}{\partial \lambda}=\frac{\partial \beta p}{\partial \lambda} \quad \text{---④}$$

$$\frac{\partial^2 \lambda p_0}{\partial \lambda^2}=\frac{\partial}{\partial \lambda}(cos\theta p) = -\sin\theta p\frac{\partial \theta p}{\partial \lambda} =\frac{-\beta p}{\sqrt{1-\beta p^2}}\,\frac{\partial \beta p}{\partial \lambda} \quad \text{---⑤}$$

Therefore, substituting ② ③ ④ ⑤ into ①

$$\frac{\partial^2\lambda_1}{\partial\lambda^2} = \frac{\partial\beta p}{\partial\lambda}\sqrt{1-\beta q^2}+\beta p\ \frac{\beta q}{\sqrt{1-\beta q^2}}\left(\frac{G}{C^2}\frac{(M_q+M_p)}{\lambda v r^2}\right) - \left(-\frac{G}{C^2}\frac{(M_q+M_p)}{\lambda v r^2}\right)\sqrt{1-\beta p^2} - \beta q\ \frac{-\beta p}{\sqrt{1-\beta p^2}}\frac{\partial\beta p}{\partial\lambda}$$

$$= \left(\sqrt{1-\beta q^2} + \beta q\frac{\beta p}{\sqrt{1-\beta p^2}}\right)\frac{\partial\beta p}{\partial\lambda} - \left(\sqrt{1-\beta p^2} + \beta p\frac{\beta q}{\sqrt{1-\beta q^2}}\right)\frac{\partial\beta q}{\partial\lambda}$$

Since $\beta p << 1$ and $\beta q << 1$ in the normal speed range

$$\frac{\partial^2\lambda_1}{\partial\lambda^2} \fallingdotseq (1+\beta p\beta q)\frac{\partial\beta p}{\partial\lambda} - (1+\beta p\beta q)\frac{\partial\beta q}{\partial\lambda} = 0$$

$$\frac{\partial\beta p}{\partial\lambda} - \frac{\partial\beta q}{\partial\lambda} = 0 \quad \text{or} \quad (M_p)\frac{\partial V}{\partial\lambda} + \frac{G}{C^2}\frac{(M_q+M_p)M_p}{\lambda v r^2} = 0$$

$(\beta p = \frac{\partial P_1}{\partial\lambda}$ $\beta q =$

$\sqrt{\left[\frac{2}{C^2}\frac{G(M_q+M_p)}{\lambda v r}\right]_{\lambda v r_2}^{\lambda v r_1}}$ M_p:*Stationary mass of the moving substance* M_q:*Stationary mass of the center*)

It becomes, The result approximates Newtonian mechanics in the normal velocity region. In a distorted three-dimensional space with the property $\beta p = \beta q$, it agrees with Newtonian mechanics. In other words, if the gravitational field angle and the momentum angle are equal, it is almost identical to Newtonian mechanics. In other words, inertial acceleration is a value that appears when a substance traveling in a distorted space passes through a stable location, and the moving body moves so that the phase angle between the spatial and the velocity is always constant.

11 Energy conservation laws in another general theory of relativity

In Section 5, we talked about the energy conservation law in another general theory of relativity. First, total energy E is

$$E= \int \frac{\partial p}{\partial t_0}d\lambda= \int \frac{\partial(m_0 C)}{\partial t_0}d(ct_0) = \int \frac{\partial(m_0 C)}{\partial t_0}dt_0 dc = m_0c^2$$

However, the static energy and kinetic energy on the right side are calculated using the law of conservation of momentum.

$$\frac{\partial pv}{\partial t_0} = \frac{\partial(m_0 v)}{\partial t_0} = \frac{\partial Wv}{\partial\lambda v} \rightarrow Wv = \int_0^v \frac{\partial(m_0 v)}{\partial t_0}d(vt_0) = \frac{1}{2}m_0v^2$$

$$\frac{\partial W_0}{\partial\lambda_0} = \frac{\partial p_0}{\partial t_0} = \frac{\partial(\gamma^{-1}m_0 c)}{\partial t_0} = m_0c^2\frac{\partial(\gamma^{-1})}{\partial\lambda} = m_0c^2\frac{\partial(\cos\theta)}{\partial\lambda} = m_0c^2\frac{\partial(\cos\theta)}{\partial\lambda_0}\frac{\partial\lambda_0}{\partial\lambda} = m_0c^2\cos\theta\frac{\partial(\cos\theta)}{\partial\lambda_0}$$

Since the static momentum is 0 at the speed of light, integration from the speed of light to v is performed.

$$W_0 = m_0c^2 \int_0^{\sin^{-1}\frac{v}{c}} \cos\theta \frac{\partial(\cos\theta)}{\partial\lambda_0} d(\lambda_0) = m_0c^2 \int_{\frac{2}{\pi}}^{\sin^{-1}\frac{v}{c}} \cos\theta d(\cos\theta) = m_0c^2 \left[\frac{1}{2} \cos^2\theta \right]_{\frac{2}{\pi}}^{\sin^{-1}\frac{v}{c}}$$

$$= \frac{1}{2} m_0c^2 \left[1-\sin^2\theta \right]_{\frac{2}{\pi}}^{\sin^{-1}\frac{v}{c}} = \frac{1}{2}m_0c^2 - \frac{1}{2}m_0v^2$$

$$W_v + W_0 = \frac{1}{2}m_0c^2$$

It becomes the calculation. This value is half of m_0c^2, but if C is calculated as a variable, it will be the same value, so there is no problem. Next, the calculation is performed in the same way as Einstein. The momentum conservation law is

$(m_0c)^2=(\gamma^{-1}m_0c)^2+(m_0v)^2$ So deform

$(m_0c^2)^2=(\gamma^{-1}m_0c^2)^2+(cm_0v)^2$

$(\gamma m_0c^2)^2=(m_0c^2)^2+(c\gamma p)^2$ $(m_0c^2)^2=(\gamma^{-1}m_0c^2)^2+(cp)^2$

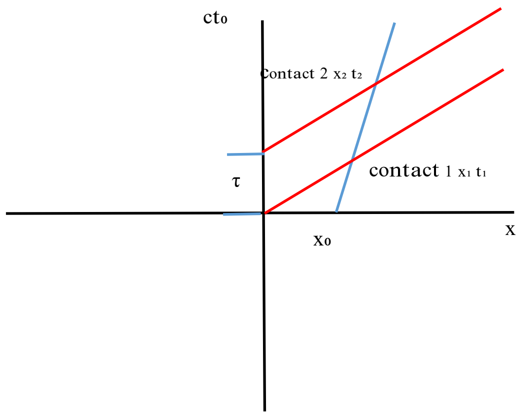
The left one is Einstein's energy conservation law, and the right one is another general relativity theory energy conservation law. Next, transform the expression on the right

$$(m_0c^2)^2=\left(\sqrt{1-\left(\frac{v}{c}\right)^2}\, m_0c^2\right)^2+(cm_0v)^2 = \left(1-\left(\frac{v}{c}\right)^2\right)m_0^2c^4 + m_0^2c^4\left(\frac{v}{c}\right)^2 = m_0^2c^4$$

And it can be seen that it almost agrees with the value obtained by integration. However, since the value obtained by integration is divided into static energy and kinetic energy components, it can be applied to Schrodinger's equation and the like. Also, the energy value is $\frac{1}{2}$, but this is considered to be the same property that the energy is halved in Dirac's equation.

12 Relativistic Doppler effect

This section describes the relativistic Doppler effect as before.



The blue line is an object moving at speed v, and the red line represents the progress of light. T is considered as the wavelength of light. Contact 1 receives light first, and contact 2 thinks that one cycle of wave travels. Then the formula is

$x_1 = x_0 + vt_1 = ct_1$

$x_2 = x_0 + vt_2 = c(t_2 - \tau)$

When the above equation is transformed

$$t_2 - t_1 = \frac{c}{c-v}\tau$$

This is the formula for the Doppler effect when the wave source is stationary. Furthermore, if Lorentz transformation is applied to this equation, the space where light travels is extended and the time of light is shortened.

$t_2' - t_1' = \gamma^{-1}(t_2 - t_1)$

$t_2' - t_1'$ is the light period τ' seen from the moving object

$$\tau' = \gamma^{-1}(t_2 - t_1) = \gamma^{-1}\frac{c}{c\text{-}v}\tau$$

$$\frac{\tau'}{\tau} = \sqrt{\frac{1+\beta}{1-\beta}}$$

This is consistent with Einstein's formula. In other words, the Doppler effect due to the reduction of the object and the Doppler effect due to the expansion of the space work the same for light observation. After this, the general formula of another general relativity will be derived, but at that time, the expansion and contraction of this space will be taken into account. Next, the calculation method of the lateral Doppler effect is calculated assuming that the light emitted from the Lorentz-contracted object has already undergone Lorentz contraction, which is exactly the same as the conventional special relativity theory.

$$\frac{\tau'}{\tau} = \frac{1 - \beta cos\theta}{\sqrt{1 - \beta^2}}$$

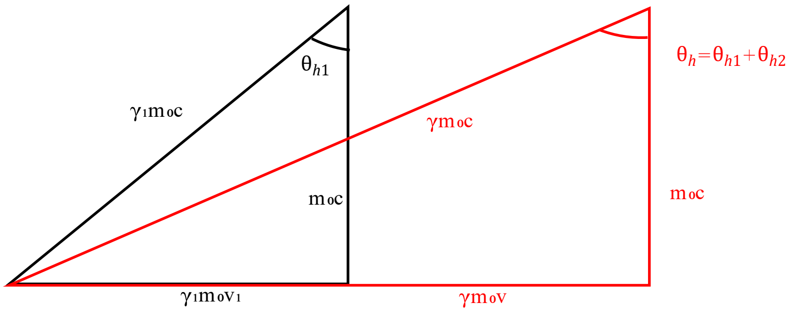
It becomes. In addition, if the speed of the moving body is accelerated by the gravitational field, the relativistic Doppler effect does not occur

$$\frac{\tau'}{\tau} = 1 - \beta cos\theta \quad \text{(when emission space is flat)}$$

It becomes such a formula.

13 Special relativity as part of another general relativity

In this way, the another general relativity is a steady-state equation of motion where the total possession momentum of the object does not change, and the special relativity is a transient equation of motion where the total momentum changes. Calculate the equation for accelerating the line of general relativity by applying energy from outside. The line of motion observed by the observer accelerating to velocity v is



$(m_0c)^2=(\frac{1}{\gamma_1}m_0c)^2+(m_0v_1)^2$ Minkowski space-time $(\frac{1}{\gamma_1}m_0c)^2=(m_0c)^2-(m_0v_1)^2$

$(m_0c)^2=(\gamma_1 m_0c)^2-(\gamma_1 m_0v)^2$ Expressed as a hyperbolic function

$(m_0c)^2=(m_0c\cosh\theta_{h1})^2-(m_0c\sinh\theta_{h1})^2$

When this equation is converted into Lorentz contraction by the speed increase,

$(m_0c)^2=(m_0c\cosh(\theta_{h1}+\theta_{h2}))^2-(m_0c\sinh(\theta_{h1}+\theta_{h2}))^2$

$\cosh\theta_{h1}=\frac{1}{\sqrt{1-\left(\frac{v_1}{c}\right)^2}}=\gamma_1$ $\cosh\theta_{h2}=\gamma_2$ $\sinh\theta_{h1}=\gamma_1\beta_1$ $\sinh\theta_{h2}=\gamma_2\beta_2$ And put

$(m_0c)^2=(m_0c(\gamma_1\gamma_2+\gamma_1\gamma_2\beta_1\beta_2))^2-(m_0c(\gamma_1\gamma_2\beta_1+\gamma_1\gamma_2\beta_2))^2$

It becomes such a conversion. Since the component of momentum conservation in general relativity is the first term on the right side, of both sides are transposed by Lorentz contraction,

$$(m_0c)^2=\left(m_0c\left(\frac{1}{\gamma_1\gamma_2+\gamma_1\gamma_2\beta_1\beta_2}\right)\right)^2+\left(m_0c\left(\frac{\gamma_1\gamma_2\beta_1+\gamma_1\gamma_2\beta_2}{\gamma_1\gamma_2+\gamma_1\gamma_2\beta_1\beta_2}\right)\right)^2$$

$$(m_0c)^2=\left(m_0c\left(\frac{1}{\cosh(\theta_1+\theta_2)}\right)\right)^2+\left(m_0c\tanh(\theta_1+\theta_2)\right)^2$$

$$(m_0c)^2=\left(\gamma^{-1}m_0c\right)^2+\left(m_0c\tanh\theta\right)^2$$

This is consistent with the calculation of Lorentz contraction using the additive law of velocity in special relativity. In other words, it absorbs energy from the outside and becomes faster than the speed of light. In order to maintain the speed of light, the distance is shortened and the moving body time is also delayed, the behavior is thought to be Lorentz contraction, in which time and space shrink. This is an assumption, but we believe that the gravitational field is extended or contracted by the amount of expansion or contraction of a force field such as another electromagnetic field. For example, when energy is exchanged between a playground and an electromagnetic field, I think that the speed of light is protected as the interaction between the motion field and the electromagnetic field, and at the same time it satisfies the law of conservation of energy.

Next, let's consider the law of motion, which we considered as special relativity. The momentum pv of special relativity is

$$pv = \gamma m_0 V$$

It can be expressed as, but the force Fv is considered to be the momentum differentiated by four-dimensional distance, since the ratio of the change in momentum to the four-dimensional distance is considered Lorentz contraction,

$$\frac{Fv}{C} = \frac{\partial pv}{\partial \lambda} = m_0 c \frac{\partial}{\partial \lambda}\left(\frac{\frac{v}{c}}{\sqrt{1-\left(\frac{v}{c}\right)^2}}\right) = m_0 c \frac{\partial}{\partial \lambda}\left(\sinh\theta_h\right) = m_0 c \frac{\partial}{\partial \theta_h}\left(\sinh\theta_h\right)\frac{\partial(\theta_h)}{\partial \lambda} \quad ---- \quad ①$$

$$\left(\sin\theta_h = \frac{\gamma v}{\gamma c} = \tanh\theta_h \quad \cos\theta = \frac{1}{\gamma} = \frac{1}{\cosh\theta_h} \quad \tan\theta_h = \gamma\frac{v}{c} = \sinh\theta_h \quad \text{Relationship exists}\right)$$

Here we calculate the derivative of the phase angle of the hyperbolic function.

$$\frac{\partial(\theta_h)}{\partial \lambda} = \frac{\partial(\cosh^{-1}\gamma)}{\partial \lambda} = \frac{\frac{1}{\gamma}}{\sqrt{1-\left(\frac{1}{\gamma}\right)^2}}\frac{\partial \gamma}{\partial \lambda} = \frac{\cos\theta}{\sqrt{1-\cos^2\theta}}\frac{\partial \gamma}{\partial \lambda} = \frac{\cos\theta}{\sin\theta}\frac{\partial \gamma}{\partial \lambda} = \frac{1}{\gamma\beta}\frac{\partial \gamma}{\partial \lambda}$$

The derivative of the phase angle of the trigonometric function is

$$\frac{\partial(\theta)}{\partial \lambda} = \frac{\partial(\sin^{-1}\beta)}{\partial \lambda} = \frac{1}{\sqrt{1-(\beta)^2}}\frac{\partial \beta}{\partial \lambda} = \frac{1}{\sqrt{1-\sin^2\theta}}\frac{\partial \beta}{\partial \lambda} = \frac{1}{\cos\theta}\frac{\partial\left(\sqrt{1-\cos^2\theta}\right)}{\partial \lambda} = \gamma\frac{1}{2\sqrt{1-\left(\frac{1}{\gamma}\right)^2}}\frac{2}{\gamma^3}\frac{\partial \gamma}{\partial \lambda}$$

$$= \frac{1}{\gamma^2}\frac{1}{\beta}\frac{\partial \gamma}{\partial \lambda}$$ That is, between θ_h and θ $\frac{\partial \theta_h}{\partial \lambda} = \gamma\frac{\partial \theta}{\partial \lambda}$ There will be a relationship

So the ①formula is

$$\frac{\partial pv}{\partial \lambda} = m_0 c \cosh\theta_h \gamma \frac{\partial \theta}{\partial \lambda} = m_0 c\, \gamma^3 \frac{\partial \beta}{\partial \lambda} \quad \rightarrow \quad Fv = \gamma^3 m_0 \frac{\partial v}{\partial t_0}$$

And such an expression. Next, the force F of the four-dimensional momentum is obtained. Since it is a Lorentz contracting motion system, the four-dimensional momentum changes. Because force F exists differently from another general relativity,

$$p = \gamma m_0 c \quad \rightarrow \quad \frac{F}{C} = \frac{\partial p}{\partial \lambda} = m_0 c \frac{\partial}{\partial \lambda}\left(\frac{1}{\sqrt{1-\left(\frac{v_1}{c}\right)^2}}\right) = m_0 c \frac{\partial}{\partial \lambda}\left(\cosh\theta_h\right) = m_0 c \frac{\partial}{\partial \theta_h}(\cosh\theta_h)\frac{\partial(\theta_h)}{\partial \lambda}$$

$$= m_0 c \sinh\theta\ \gamma^2 \frac{1}{c}\frac{\partial v}{\partial \lambda} \quad \rightarrow \quad F = \gamma^3 m_0 \frac{\partial v}{\partial t_0}\sin\theta$$

is the value obtained by decomposing the force in the three-dimensional momentum direction. This is thought to be because the acceleration of special relativity is acceleration in three-dimensional space. In other words, force can be thought of as the reaction when an object receives energy from another moving body or force field, and moves out of geodesic. The reaction is the value obtained by differentiating the four-dimensional distance that has advanced the momentum in each direction as a parameter.

$$Fn = c\frac{\partial pn}{\partial \lambda} \quad (n = 0,1,2,3)$$

It becomes.

14 Summary of Newtonian theory of relativity

In this section, we summarize the properties explained in another theory of relativity.

・ First law　Law of inertia(Another general relativity)

An object performing a certain motion does not change its four-dimensional momentum unless it receives external energy interference. The velocity is the speed of light. When the properties at that time are geometrically expressed, the object passes through a position where the retained energy per surface volume of the traveling section is minimal. If its properties are briefly described, it can be expressed that the force in all directions becomes zero. The apparent acceleration and deceleration due to gravity is inertial motion. In the expression

$$p^2=(m_0c)^2=(\frac{1}{\gamma}m_0c)^2+(m_0v)^2 \qquad p = const$$

$$\frac{\partial W}{\partial \lambda_0}\times\frac{\partial W}{\partial \lambda_1}\times\frac{\partial W}{\partial \lambda_2}\times\frac{\partial W}{\partial \lambda_3}= 0 \quad Fn = 0\ (n = 0,1,2,3)$$

$$\frac{\partial p_1}{\partial \lambda \alpha_1} + \frac{\partial p_2}{\partial \lambda \alpha_2} + \frac{\partial p_3}{\partial \lambda \alpha_3} =0 \qquad (\alpha_n= \sin\left(sin^{-1}\frac{\partial \lambda_n}{\partial \lambda} + \Delta\theta q(\lambda)+cos^{-1}\left(\frac{v_{0_n}}{c}\right)\right))$$

$$p'q'+qp = \frac{\partial P_0}{\partial \lambda}\frac{\partial Q_0}{\partial \lambda} + \frac{\partial Q_1}{\partial \lambda}\frac{\partial P_1}{\partial \lambda}= 0$$

$$pq'-qp' = \frac{\partial P_1}{\partial \lambda}\frac{\partial Q_0}{\partial \lambda} - \frac{\partial Q_1}{\partial \lambda}\frac{\partial P_0}{\partial \lambda}= 0$$

(α_n:What converted motion coordinates to speed of light)

(p':Cosθp of the momentum of the moving body)

(p: $\frac{\partial p}{\partial \theta}$ is the sinθp component of the moving body momentum)

(P_0:Moving distance of moving body　P_1:3D distance of moving body)

(q':Cosθq of the momentum of the central object)

(q:The sinθq component of the momentum of the central object)

(Q_0:Static distance of the central object　Q_1:3D distance of central object)

It becomes something.

・ Second law　Law of motion(Special relativity)

When a force is applied to an inertial system, the object increases its velocity while Lorentz contracting. The equation when the force is applied in three dimensions is

$$Fv = \gamma^3 m_0 \frac{\partial v}{\partial t_0} \qquad \text{However} \quad \gamma = \frac{1}{\sqrt{1-\left(\frac{v}{c}\right)^2}} \quad \text{To be}$$

It becomes.

・ Third law　Action reaction law(Special relativity)

An object moving in a certain inertial system receives a reaction when it moves out of the inertial system. When expressed by an expression.

$$Fn = c\frac{\partial p_n}{\partial \lambda} \quad (n = 0,1,2,3)$$

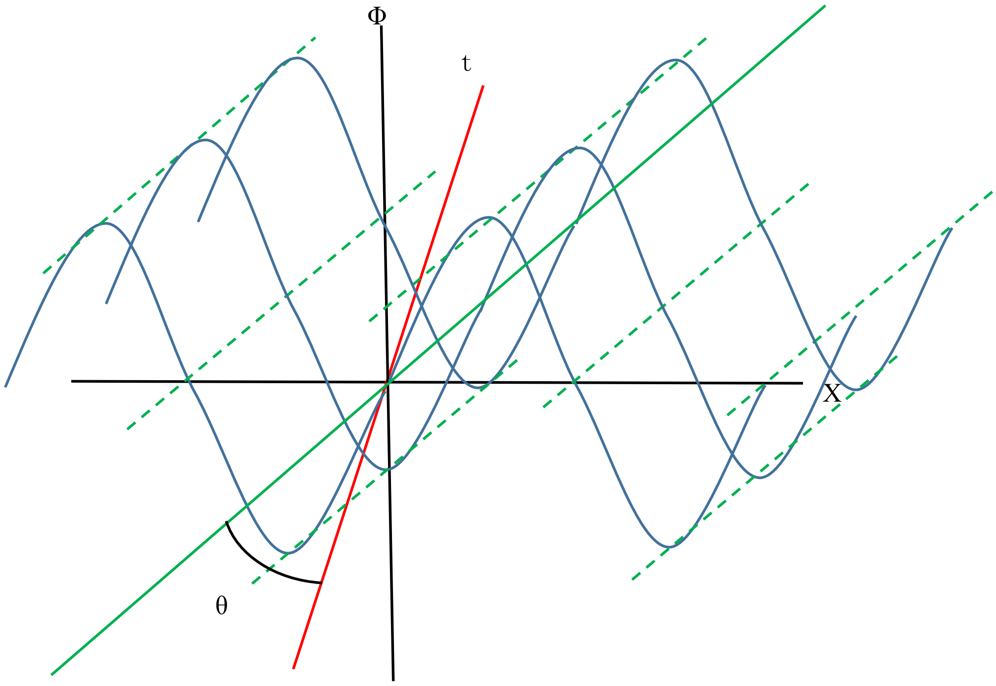
It becomes. In summary, this is the case, and with respect to the second and third laws, only the calculation of the line segment where the stationary momentum is constant is performed. Probably, there is also a movement that increases the resting momentum while keeping the three-dimensional momentum constant.　The expression in the third column of the first law indicates that an object travels at the speed of light in the four-dimensional direction. Derivation of the formula in the third column will be described in the next section.

15 Generalization of another general relativity

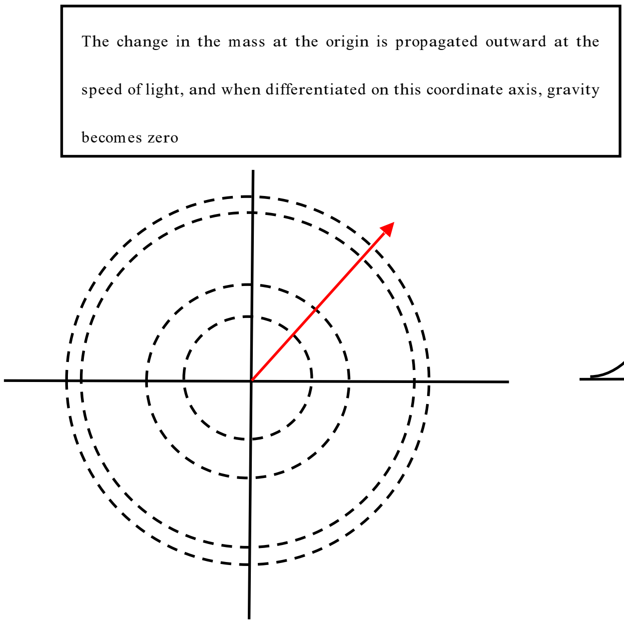
In the previous section, another theory of relativity was described as three laws of motion similar to Newtonian mechanics. In this section, I will generalize it. Although the motion in the gravitational field has been described in the previous section, the equation of motion cannot be described in the force field in which the mass field at the origin changes with time.If all field displacements travel at the speed of light, then the displacement of the gravitational field must also travel at the speed of light. In other words, in the case where the mass of the origin changes over time, the change over time of the gravitational field is transmitted at the speed of light, and the object that inertially moves in synchronization with the wave should also swing. This concept is exactly the same as Einstein, but uses the mathematics of the four-dimensional space and the above-mentioned wave equation as mathematics representing general formulas. The wave equation is

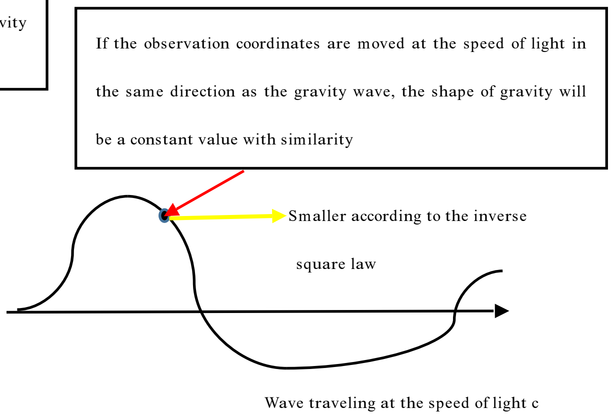
$$\frac{\partial \Phi(x,t)}{\partial \alpha} = 0 \qquad \Phi(x、t) = \Phi(\alpha、\beta)$$

$$=\Phi\left(\sqrt{x^2+t^2}\,\cos\left(\tan^{-1}\frac{t}{x} - \tan^{-1}\frac{1}{c}\right)、\sqrt{x^2+t^2}\,\sin\left(\tan^{-1}\frac{t}{x} - \tan^{-1}\frac{1}{c}\right)\right)$$



The meaning is that a wave transmitted at the speed of light will be zero when differentiated by coordinates converted to the speed of light(Differentiating with the green coordinate axis gives 0). This equation is applied to an object that freely falls on a mass point. Assuming that the mass of a mass point oscillates and that the variation in mass diverges outward at the speed of light according to the four-dimensional distance. The gravitational field of an object moving at the speed of light in the direction of its divergence is not directry affected by the temporal vibration of the mass, but becomes a value dependent on the value of the mass at a certain time point, and when differentiated by the coordinates of the normal component, the function of the position with respect to the space should be 0. If you show it in a diagram





That is, it is considered that the momentum Pn, which is a function of the four-dimensional coordinate system, is differentiated by the coordinate α of the red line, its value is 0. In the drawing, the red line is in a three-dimensional direction, but the coordinates used in the equation are in a four-dimensional direction. In order for the four-dimensional coordinate system to have this property, the coordinate system must be point-symmetric with respect to the origin. A field that satisfies Gauss's theorem is point symmetric, and this coordinate system exists. First, ignoring Gauss's theorem, considering the equation only by acceleration of momentum

$$\frac{\partial p(\lambda_0, \lambda vr, \lambda vl)}{\partial \alpha t_0} = 0 \quad \alpha = \sin\left(sin^{-1} \frac{\partial \lambda vr}{\partial \lambda} + \Delta\theta q(\lambda) + cos^{-1}\left(\frac{v_0}{c} \right) \right)$$

$sin^{-1} \frac{\partial \lambda vr}{\partial \lambda}$: Speed angle before light speed coordinate conversion

$\Delta\theta q(\lambda)$: Angle of inertial acceleration distributed as a function of position

$cos^{-1}\left(\frac{v_0}{c} \right)$: The initial speed is angled and the phase is shifted by $\frac{\pi}{2}$. This conversion converts the initial velocity v_0 to the speed of light.

It becomes something. Let's solve this equation and see that it becomes a line segment of the another general theory of relativity described so far. For simplicity, calculate the circumferential velocity Vl as 0(Consider only free-fall components).

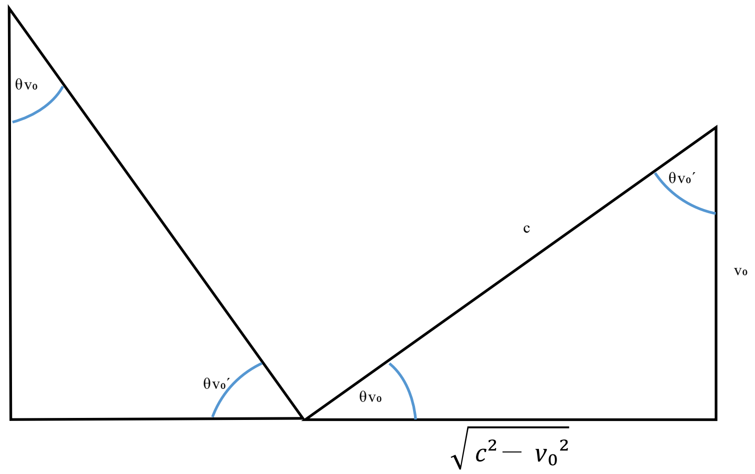
$$p(\lambda_0, \lambda vr) = p(\alpha、\beta) \quad \rightarrow \quad \frac{\partial p(\alpha,\beta)}{\partial \alpha} = 0 \quad \rightarrow$$

$$p(\beta) = q\left(cos\left(sin^{-1} \frac{\partial \lambda vr}{\partial \lambda} + \Delta\theta q(\lambda) + cos^{-1}\left(\frac{v_0}{c} \right) \right) \right) \quad \text{----①}$$

is a temporary solution, but breaks down. ① Summarizing the first and third terms on the right side of the equation

$$\cos\theta vr = \cos(\theta v + \theta v_0) = \frac{\partial\lambda_0}{\partial\lambda}\left(\frac{v_0}{c}\right) - \frac{\partial\lambda vr}{\partial\lambda}\sqrt{1-\left(\frac{v_0}{c}\right)^2} \quad \text{----②}$$

Here, $\theta v_0{}' = \frac{\pi}{2} + \theta v_0$ holds. As shown in the figure



And using this relationship to transform the formula

$$\frac{\partial\lambda_0}{\partial\lambda}\left(\frac{v_0}{c}\right) - \frac{\partial\lambda vr}{\partial\lambda}\sqrt{1-\left(\frac{v_0}{c}\right)^2} = \cos\theta v \cos\theta v_0 - \sin\theta v \sin\theta v_0 = \cos\theta v \sin\theta v_0{}' + \sin\theta v \cos\theta v_0{}'$$

$$\cos\theta vr = \cos(\theta v + \theta v_0) = \sin(\theta v + \theta v_0{}') = \sin\theta vr' \quad \text{----③}$$

It can be seen that such a relationship holds. So, if we apply equation ③to equation ②

$$\cos(\theta vr + \Delta\theta(\lambda)) = \cos\theta vr \cos\Delta\theta(\lambda) + \sin\theta vr \sin\Delta\theta(\lambda)$$

$$\cos\theta vr = \sin\theta vr' \qquad \sin\theta vr = -\cos\theta vr'$$

$$\cos\theta vr \cos\Delta\theta(\lambda) - \sin\theta vr \sin\Delta\theta(\lambda) = \sin\theta vr' \cos\Delta\theta(\lambda) + \cos\theta vr' \sin\Delta\theta(\lambda)$$

$$\cos(\theta vr + \Delta\theta(\lambda)) = \sin(\theta vr' + \Delta\theta(\lambda)) = \sin(\theta v + \theta v_0{}' + \Delta\theta(\lambda))$$

And the general solution is

$$q(\lambda_0、\lambda vr) = f(\sin(\sin^{-1}\frac{\partial\lambda vr}{\partial\lambda} + \sin^{-1}\frac{v_0}{c} + \theta(\lambda))$$

This is a line segment of another general theory of relativity that has been described so far.If the origin mass fluctuates, it appears as a change in θ (λ), $\frac{\partial\lambda vr}{\partial\lambda}$ changes to satisfy the wave equation. Now consider the property of $\frac{\partial q(\lambda_0,\lambda vr,\lambda vl)}{\partial\alpha}$. As shown in Section 10, the gravitational field can be thought of as a point-symmetric field that satisfies the same Gaussian law as Newtonian mechanics.Then, when $\frac{\partial q(0,vr,vl)}{\partial\alpha}$ is integrated with the surface area Sλ surrounded by the equal distance of the four-dimensional distance ($\lambda = ct_0$), the value is considered to be 0.

$$\oint_{S_\lambda} \frac{\partial q(\lambda_0、\lambda vr、\lambda vl)}{\partial\left(sin\left(sin^{-1}\frac{\partial\lambda vr}{\partial\lambda}+\Delta\theta q(\lambda)+cos^{-1}\left(\frac{v_0}{c}\right)\right)t_0\right)} dS_\lambda = 0$$

However, since this is Gauss' law, if the condition of this λ line segment is λ ($\lambda\beta$, $\lambda\alpha_1$, $\lambda\alpha_2$, $\lambda\alpha_3$)

$$\frac{\partial q}{\partial\lambda\alpha_1}+\frac{\partial q}{\partial\lambda\alpha_2}+\frac{\partial q}{\partial\lambda\alpha_3}= 0 \qquad \frac{\partial q}{\partial\lambda_\beta} \neq 0$$

Can be rewritten as

Here, $\lambda\alpha_1$, $\lambda\alpha_2$, and $\lambda\alpha_3$ are obtained by converting the motion according to the free fall motion into light speed coordinates and are considered to be three-dimensional coordinates.

$\nabla\alpha \cdot p=0$

This is similar to Bianchi's identity in Einstein's general theory of relativity. Next, assuming that the momentum p falls freely in this coordinate system,

$$\frac{\partial p}{\partial\lambda\alpha_1}+\frac{\partial p}{\partial\lambda\alpha_2}+\frac{\partial p}{\partial\lambda\alpha_3}= 0 \qquad \frac{\partial p}{\partial\lambda_\beta} \neq 0$$

And put together

$$\frac{\partial q}{\partial\lambda\alpha_1}+\frac{\partial q}{\partial\lambda\alpha_2}+\frac{\partial q}{\partial\lambda\alpha_3} = \kappa\left(\frac{\partial p}{\partial\lambda\alpha_1}+\frac{\partial p}{\partial\lambda\alpha_2}+\frac{\partial p}{\partial\lambda\alpha_3}\right) \text{ ----④}$$

It looks like this. In this formula, the left side represents the field created by the central body mass as virtual momentum, the right side is the momentum of free fall at the coordinates. Since the right and left sides of the equation are both 0, any value of κ may be used. However, since the equation cannot be deformed as it is, the coefficient κ is determined so that the equation can be deformed. First, consider the momentum p of a moving object.

$$Wp=\int\frac{\partial p}{\partial t_0}d\lambda = \int\frac{\partial(m_0C)}{\partial t_0}d(ct_0) = \int\frac{\partial(m_0C)}{\partial t_0}dt_0dc = \frac{1}{2}Mp_0c^2 \quad (Mp_0\text{: Moving mass of moving body})$$

$$\frac{1}{2}Mp_0c^2= \frac{1}{2}\left(Mp_0c^2- Mp_0v^2\right)+\frac{1}{2}Mp_0v^2$$

The force Fp on the left side of this equation is 0, but the value on the right side changes virtually, so

$Fp^2= Fp_0^2+ Fpv^2$ →

$$\left(\frac{\partial}{\partial\lambda}\left(\frac{1}{2}Mp_0c^2\right)\right)^2=\left(\frac{\partial}{\partial\lambda_0}\left(\frac{1}{2}Mp_0c^2-\frac{1}{2}Mp_0v^2\right)\right)^2+\left(\frac{\partial}{\partial\lambda v}\left(\frac{1}{2}Mp_0v^2\right)\right)^2$$

And such an expression. Next, consider the pseudo-momentum Q produced by a stationary mass. In Section 10, we calculated the spatial distribution of acceleration using $\frac{G}{C^2}\frac{Mp_0+ Mq_0}{\lambda^2}$, but in this section we use $\frac{4\pi G}{c^4}\frac{(Mp_0+ Mq_0)c^2}{4\pi\lambda^2}$ to compare with Einstein's theory of general relativity.

$$\mathrm{Fqv} = \frac{4\pi G}{c^4}\ \frac{Mp_0(Mp_0+Mq_0)c^2}{4\pi\lambda^2} \quad \rightarrow \quad \frac{\partial\lambda qv}{\partial\lambda} = \int \frac{4\pi G}{c^4}\ \frac{(Mp_0+Mq_0)c^2}{4\pi\lambda^2}\ d\lambda = \frac{4\pi G}{c^4}\int \nabla\ (Mp_0+Mq_0)c^2 d\lambda$$

Becomes. If we give virtual mass 1 and consider it as virtual momentum,

$$\left(\frac{\partial q_0}{\partial\lambda}\right)^2 + \left(\frac{\partial qv}{\partial\lambda}\right)^2 = \left(\frac{4\pi G}{c^4}\right)^2$$

$$\frac{\partial\lambda_0}{\partial\lambda} = \sqrt{\frac{4\pi G}{c^4} - \left(\frac{\partial qv}{\partial\lambda}\right)^2}$$

You can think of a line segment like

$$\left(\frac{\partial q}{\partial\lambda}\right)^2 = \left(\frac{4\pi G}{c^4}\right)^2$$

It can also be. This is an extension of the calculation in Section 10 and acceleration is distributed in space as distortion of space, and that moving an object along it is inertial acceleration. Also, considering that Gauss's law is satisfied, a potential of $4\pi Gc^4 m_0 c^2$ is distributed over a surface area having the same distance λ. Here, the position momentum is taken as the distortion of the virtual space, and the equation is calculated. The Lagrangian of the space described in Section 10 has the form F_0-F_1 = 0, but if we consider that the force F resulting from the momentum p and the position momentum q holds,

$$\mathrm{Fq}'' - \mathrm{Fp}'' = 0 \quad \rightarrow \quad \frac{4\pi G}{c^4}\ \nabla(Mp_0+Mq_0)c^2 - \frac{1}{2}\frac{\partial}{\partial\lambda}(mp_0c^2) = 0$$

$$\nabla(Mp_0+Mq_0)c^2 = \mathrm{Fq}' \quad \frac{4\pi G}{c^4}\mathrm{F}q' = \mathrm{Fq} \quad , \frac{\partial}{\partial\lambda}(mp_0c^2) = \mathrm{Fp}' \quad , \mathrm{Fp}' = \frac{8\pi G}{c^4}\ \mathrm{Fp}$$

$$\frac{4\pi G}{c^4}\ \mathrm{Fq}' = \frac{1}{2}\ \mathrm{F}p \quad \rightarrow \quad \frac{8\pi G}{c^4}\ \mathrm{Fq}' = \mathrm{Fp}' \quad \rightarrow \quad \mathrm{Fq} = \frac{8\pi G}{c^4}\ \mathrm{Fp}$$

Becomes. In this equation, the unit based on the position and momentum on the left side is based on a value corrected by the universal gravitational constant, and the right side is a value based on m_0c^2. That is, if the distortion of the space is described based on the total energy of the moving body momentum, it is too large, so the force is corrected to a force corresponding to the universal gravitational constant. As a result, the units of momentum and position momentum were unified. Substituting κ into the wave equation ④

$$\frac{\partial q}{\partial\lambda\alpha_1} + \frac{\partial q}{\partial\lambda\alpha_2} + \frac{\partial q}{\partial\lambda\alpha_3} = \frac{8\pi G}{c^4}\left(\frac{\partial p}{\partial\lambda\alpha_1} + \frac{\partial p}{\partial\lambda\alpha_2} + \frac{\partial p}{\partial\lambda\alpha_3}\right) \quad \text{----⑤}$$

It becomes such an expression. This is the same form as Einstein's theory of general relativity. The calculations so far have been to express the line segments of another general relativity in four-dimensional geometry instead of Riemannian geometry. Therefore, it can be said that the form of the expression itself is almost the same.

As we have found so far, the right side and the left side are both 0, so the reft side and right side is united with = and the equation is made. The transformation that the left side changes according to the right side is mathematically possible, but not in the way of thinking about the equation. The right side also becomes 0 without permission, and the left side also becomes 0 without permission. We want to process it into an equation in which the momentum p and the position momentum q change while maintaining the mutual relationship, and further modify the equation. As described in section 10, the position momentum and the momentum move while maintaining a constant phase angle in the inertial motion system.

$pq' - qp' = 0 \quad , \quad p'q' + qp = 0$

If we use a matrix to combine this into a single expression

$$\dot{P} = p \begin{bmatrix} cos\theta p & -sin\theta p \\ sin\theta p & cos\theta p \end{bmatrix} \qquad \dot{Q} = q \begin{bmatrix} cos\theta q & -sin\theta q \\ sin\theta q & cos\theta q \end{bmatrix}$$

$$\dot{P} \times \dot{Q} = pq \begin{bmatrix} cos\theta p cos\theta q - sin\theta p sin\theta q & -(sin\theta p cos\theta q + cos\theta p sin\theta q) \\ sin\theta p cos\theta q + cos\theta p sin\theta q & cos\theta p cos\theta q - sin\theta p sin\theta q \end{bmatrix}$$

$$= pq \begin{bmatrix} cos(\theta p + \theta q) & -sin(\theta p + \theta q) \\ sin(\theta p + \theta q) & cos(\theta p + \theta q) \end{bmatrix} = \dot{\Phi}$$

Can be written. In other words, when expressed by the wave equation

$$\frac{\partial \dot{\Phi}}{\partial \alpha} = 0 \qquad \frac{\partial \dot{\Phi}}{\partial \beta} \neq 0 \quad \dot{\Phi} = pq \begin{bmatrix} cos(\theta p + \theta q) & -sin(\theta p + \theta q) \\ sin(\theta p + \theta q) & cos(\theta p + \theta q) \end{bmatrix}$$

$$\alpha = \sin\left(sin^{-1} \frac{\partial \lambda vr}{\partial \lambda} + \Delta\theta q(\lambda) + cos^{-1}\left(\frac{v_0}{c} \right) \right) \qquad \beta = \cos\left(sin^{-1} \frac{\partial \lambda vr}{\partial \lambda} + \Delta\theta q(\lambda) + cos^{-1}\left(\frac{v_0}{c} \right) \right)$$

----⑥

It becomes an expression like this. The general formula of another general relativity is completed for the time being by ⑥. The mass that generates the gravitational field in this equation is calculated not by the static mass $\{\gamma m_0\}$ but by the absolute mass m_0.

16 Extension of another general relativity

In the previous section, another general theory of relativity was treated as a wave equation, and it was an equation to be satisfied in a fluctuating gravitational field. By the way, it is understood that this physical quantity Φ has a property similar to the wave function of Schrodinger's equation. Here, the current Φ is a two-dimensional coordinate. So if you expand to 4D coordinates

$$\dot{\Phi} = \Phi \begin{bmatrix} cos\theta_0 & -sin\theta_0 & 0 & 0 \\ sin\theta_0 & cos\theta_0 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & cos\theta_1 & -sin\theta_1 & 0 \\ 0 & sin\theta_1 & cos\theta_1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & cos\theta_2 & -sin\theta_2 \\ 0 & 0 & sin\theta_2 & cos\theta_2 \end{bmatrix}$$

θ_0 : Static momentum angle $\theta_1\theta_2$: Momentum angle

Matrix product like. Here, if the value of $\frac{\partial\dot{\Phi}}{\partial\beta}$ can be calculated, it is considered to be completed as an equation.

First, we will consider the α axis. The α-axis is obtained by transforming a force field radiating from a mass point into light velocity coordinates in a direction of divergence. In other words, if the gravitational force becomes zero when differentiated by the speed of light in the divergent direction, the equation holds. Conversely, a wave completely perpendicular to the event horizon will emerge without being affected by the black hole. The formula for the velocity of the gravitational field is

$$\frac{\partial\lambda vr}{\partial\lambda} = \sqrt{\left[\frac{2}{C^2}\frac{G(M_q+M_p)}{\lambda vr}\right]_{\lambda vr_2}^{\lambda vr_1}}$$

But I think about M_p. We consider that the mass that gives rise to the gravitational field is not the absolute mass Mp but there is the rest mass γ^{-1}Mp. Then, as the moving body accelerates, the gravitational field created by the moving body itself becomes smaller. This property seems to be in good agreement with the property shown by another general theory of relativity. And its loses rest mass as it falls into a black hole and eventually breaks down to light that have momentum of m_0c and falls into a black hole. Then, only the gravitational field formula of the moving body is

$$\frac{\partial\lambda vr}{\partial\lambda} = = \frac{1}{\gamma}\sqrt{\left[\frac{2\,GM_p}{C^2\,\lambda vr}\right]_{\lambda vr_2}^{\lambda vr_1}}$$

It becomes such an expression. In this equation, it can be seen that the expansion rate of the gravitational field at the speed of light is infinite. In other word the curvature is zero. And the property that the space expands by conjunction with the resting momentum is in good agreement with the property that the space expands as it approaches the speed of light. If this property can be applied to the field created by the central static mass which is the center of the gravitational field, $\frac{\partial\dot{\Phi}}{\partial\alpha} = 0$ can be realized. When viewed from an observer in the same coordinate system as the stationary object, the stationary mass of the moving object decreases, but the central mass does not change, and therefore the gravitational field does not change. Then, it may be assumed that the gravitational field viewed from the moving body changes due to the Doppler effect due to the speed of the moving body. Doppler effect is

$$\tau' = \gamma^{-1}(t_2 - t_1) = \gamma^{-1}\frac{c}{c\text{-}v}\ \tau$$

It becomes. Here, the $\frac{c}{c\text{-}v}$ component is a normal Doppler effect without relativistic effects.

This means that if the receiving object is stationary, the wavelength of the light will not change, but if it is moving, the moving spectrum will arrive slower or faster and the Doppler effect will occur. We assume that the Doppler effect of light causes the gravitational field to expand and contract, and that the magnitude of gravity changes. So suppose the distance traveled as an object is zero. In the expression

$$t_2 = \frac{\Delta x}{c} + \tau \quad \Delta x \to 0 \quad t_2 = \tau$$

The nonrelativistic Doppler effect becomes zero at the minimum length Δx. In other words, the wavelength of light is

$$\lambda' = \frac{1}{\gamma}\ \lambda$$

The light seen from an object moving at the speed of light is extended to infinity. At this time, it is assumed that the gravitational field is also extended to infinity at the same ratio.

$$\frac{\partial \lambda vr}{\partial \lambda} = \frac{1}{\gamma}\sqrt{\left[\frac{2\,\mathrm{GM}_q}{\mathrm{C}^2\,\lambda vr}\right]_{\lambda vr_2}^{\lambda vr_1}}$$

At this time, considering the mass M_p of the moving body

$$\frac{\partial \lambda vr}{\partial \lambda} = \frac{1}{\gamma}\sqrt{\left[\frac{2\,\mathrm{G}(\mathrm{M}_q+\mathrm{M}_p)}{\mathrm{C}^2\quad \lambda vr}\right]_{\lambda vr_2}^{\lambda vr_1}}$$

It can be transformed into the following equation. In other words, if the curvature of the space is constructed according to this concept, the differentiation in the light velocity conversion coordinates in the falling direction will be completely zero. This equation shows that the acceleration applied to the motion field at the same speed of light as the direction of the gravitational field is zero. If it is limited to the speed of light, the virtual force will be applied only in the right angle direction. If you think so, gravity is an outer product, not an inner product, which has properties similar to Lorentz force in an electromagnetic field. In other words, it feels like an inner product in the three-dimensional direction, but when considering the four-dimensional direction, it is the virtual force that acts only on the orthogonal component of the motion field and the gravitational field. As a result, the differential value of the α component becomes 0 and another general relativity general formula is

$$\frac{\partial \dot{\Phi}}{\partial \alpha_1} + \frac{\partial \dot{\Phi}}{\partial \alpha_2} + \frac{\partial \dot{\Phi}}{\partial \alpha_3} = 0$$

$\frac{\partial \dot{\Phi}}{\partial \beta} \neq 0$

$\nabla\alpha\dot{\Phi}=0$ If it is a two-dimensional component $\dot{\Phi}= pq \begin{bmatrix} cos(\theta p+\theta q) & -sin(\theta p+\theta q) \\ sin(\theta p+\theta q) & cos(\theta p+\theta q) \end{bmatrix}$

If you write up to 4 dimensions $\dot{\Phi}= pq \begin{bmatrix} cos\theta_0 & -sin\theta_0 & 0 & 0 \\ sin\theta_0 & cos\theta_0 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & cos\theta_1 & -sin\theta_1 & 0 \\ 0 & sin\theta_1 & cos\theta_1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & cos\theta_2 & -sin\theta_2 \\ 0 & 0 & sin\theta_2 & cos\theta_2 \end{bmatrix}$

It was very simple. This represents the law of conservation of energy itself, which means that the law of conservation of energy is equivalent to the law of invariance of light speed. Also, in the gravitational field for which this calculation was performed, the parallel energy components of the energy waves do not interact with each other, and only the orthogonal components interact. Furthermore, it seems that this property may define a dimension. In other words, if there is a wave that interacts only when it is orthogonal to all components of the wave function existing in the three-dimensional space distorted in the four-dimensional direction, it can be said that it is a new dimension.

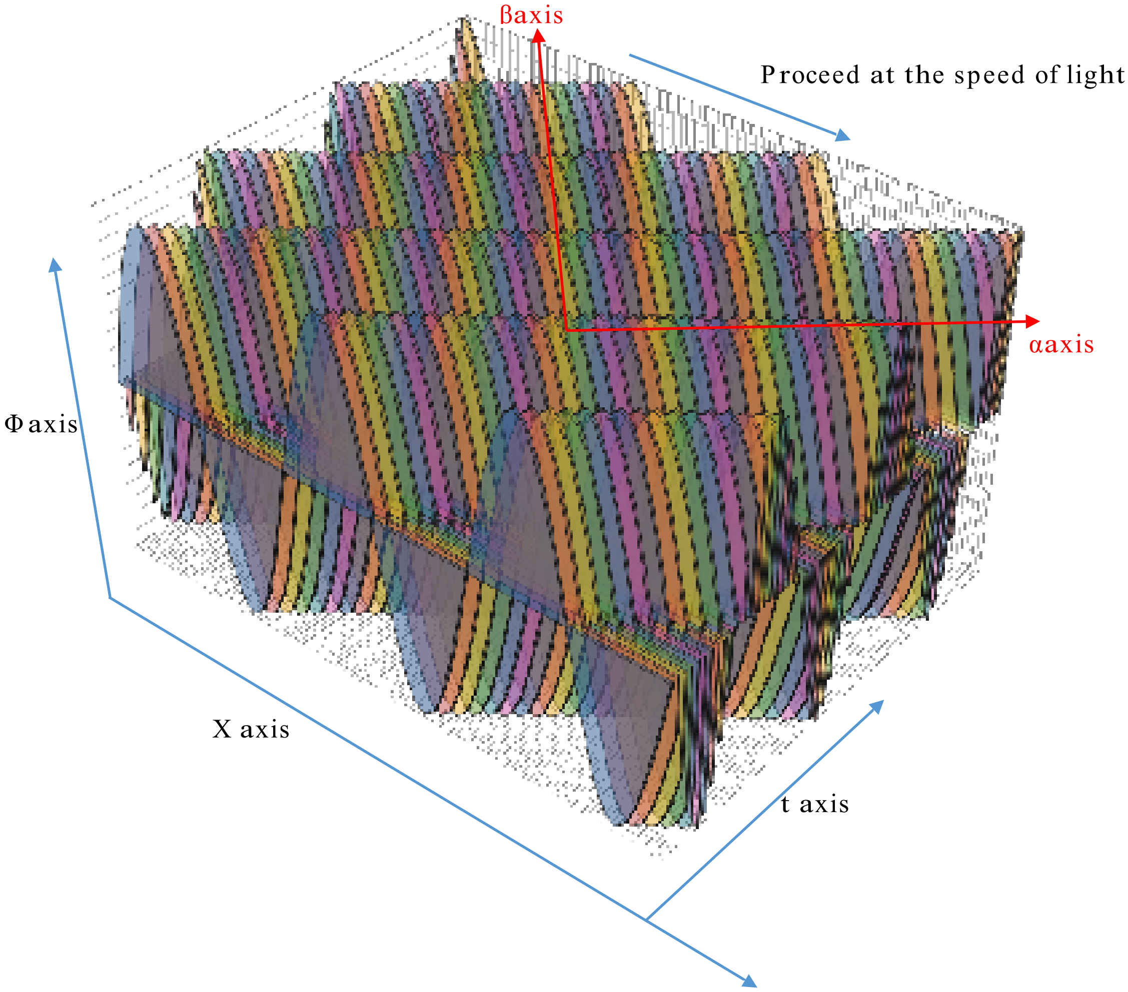
16 Calculation of the basis value of another general relativity space

Until now, the Lagrangian of the speed of light with respect to the divergence direction of the momentum function Φ was calculated to be 0, and the wave equation was calculated. Here, the differentiation of the β axis will be considered.

Since the α axis is the speed of light in the direction of the gravitational field converted to the speed of light, the β axis can be expressed as

$$\beta = \cos\left(sin^{-1} \frac{\partial\lambda vr}{\partial\lambda} + \Delta\theta q(\lambda) + cos^{-1}\left(\frac{v_0}{c}\right) \right)$$

It can be seen that the coordinates represent stationary coordinates. Now consider the prototype of the wave equation described in section 7-2. The equation was obtained assuming that the property that the value becomes 0 when differentiated on the α axis is a wave equation. It can be seen that differentiating on the β-axis results in differentiation at coordinates where the wavelength is minimal. The following is shown in the figure. In other words, it is considered that the base value of the gravitational field can be calculated by obtaining the value on the β-axis.



Here, we consider the differentiation of the β-axis with a basic wave function.

$\Phi(x\,,\quad t) = \sin\left(\frac{2\pi}{\lambda}\left(x\text{-}ct\right)\right)$ Differentiate the function represented by with β axis

$$\beta = \sqrt{x^2+t^2}\; sin(tan^{-1}\frac{t}{x}\;\;\text{-}\;tan^{-1}\frac{1}{c})$$

$$= \frac{-1}{\sqrt{c^2+1}}\;(x - ct)$$

Is Φ

$$\Phi(x\,,\quad t) = \sin\left(\frac{2\pi}{\lambda}\left(x\text{-}ct\right)\right) = \sin\left(\text{-}\frac{2\pi}{\lambda}\sqrt{c^2+1}\;\;\beta\right)$$

$$\frac{\partial\Phi}{\partial\beta} = -\frac{2\pi}{\lambda}\sqrt{c^2+1}\;\cos\left(\frac{2\pi}{\lambda}\left(x\text{-}ct\right)\right)$$

And this value is the form of the basis of the wave function.

Apply this to the gravitational field equation

$\frac{\partial\Phi(\alpha,\beta)}{\partial\beta}$ In Although $\nabla\alpha \cdot \Phi=0$

So

$\frac{\partial\Phi(\alpha,\beta)}{\partial\beta}=\frac{\partial\Phi(\beta)}{\partial\beta}$ Becomes

Here, Φ (β) is a function in which the combined momentum Φ is divided into an orthogonal axis having a constant value and a light axis.

$$\frac{\partial\Phi(\alpha,\beta)}{\partial\beta} = \frac{\partial\Phi(\beta)}{\partial\beta} = f(\beta)$$

And summing up the equations

$$(\nabla_\alpha+D_\beta)\cdot\Phi(\beta,\alpha)= \oint (\nabla_\alpha+D_\beta)\cdot\dot{\Phi}(\beta,\alpha)dS_\alpha = f(\beta)$$

It becomes the form. The meaning is that the synthetic momentum Φ becomes 0 when differentiated at the speed of light in the direction of divergence of the source of the gravitational field, and becomes a function of β when differentiated at stationary coordinates. Also consider that the solution is (∫ PQ $d\beta$) which is the inverse operation from the answer. Applying Gauss's theorem here.

$$\oint (\nabla_\alpha+D_\beta)\cdot\dot{\Phi}(\beta,\alpha)dS_\alpha=\oint\frac{\partial\Phi(\beta)}{\partial\beta}dS_\alpha$$

If the center mass of the gravitational field does not change, the right side is considered to be a constant,

$$\oint (\nabla_\alpha+D_\beta)\cdot\dot{\Phi}(\beta,\alpha)dS_\alpha= \Phi S\alpha \qquad \Phi = m_0C$$ （If you take space-time as Q=1 ）

It can be seen that the shape is very similar to Dirac's equation.

Here, let us consider the energy of Q (virtual momentum of a mass point at the center). The energy of Q is stationary as seen from the observer

$Eq =\frac{1}{\gamma} M_q c^2 = M_q c^2$ Should be. If the mass that creates the gravitational field is a static mass, if all the mass diverges into space as gravitational waves, no energy should remain there. In other words, it can be considered that this value must be equal to the gravitational field energy of the entire space. If the space is closed in one dimension

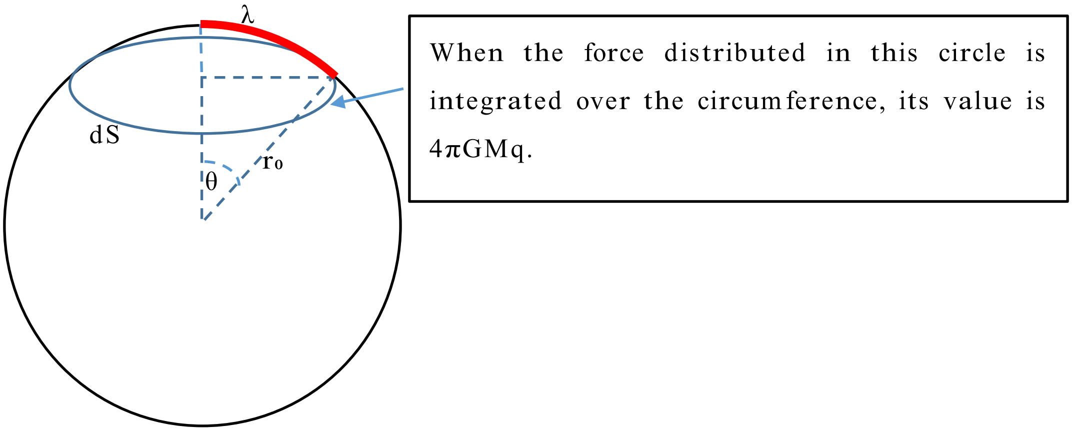
$\oint Q\, d\lambda = Mqc^2T = nh$ (T ： The time that takes Q to go around)

Which is similar to de Broglie's law. This idea is extended to three-dimensional space.

First, assuming that this world is closed 3D, the surface volume of the 4D sphere mentioned above can be considered as the most stable candidate for closed 3D space. Assuming that these lines of force diverge from a certain point

$$\oint (\nabla_\alpha \cdot Q)\, dS = Fq(\mathrm{const}) = 4\pi G M_q$$

You can think like this. When expressed as a three-dimensional sphere



The idea is as follows. Unlike the law of universal gravitation, the force field was forced to close, it becomes possible to perform the circular integration in the λ direction. And its value must be Mqc^2

$$\int Fq\, d\lambda = 4\pi G M_q c T = M_q c^2$$

$$T = \frac{c}{4\pi G}$$

Becomes(It is calculated to be 11.3 billion light years.). That is, it can be considered that the sphysical quantity Q on the Gaussian surface has a constant value. In the case of this formula, we are considered that space to distorted in the λ direction is a force. However, in the case of another general relativity, this calculation cannot be performed because the vector of the distortion in each direction is always 0. Therefore, it is assumed that the stationary momentum Q is distributed on the Gaussian surface.

$$\oint (\nabla_\alpha + D_\beta) \cdot \dot{\Phi}(\beta,\alpha)\, dS_\alpha = f(\beta) S_\alpha = P(QS_\alpha)$$

QSα in this equation can be considered as the momentum distributed on the Gaussian surface, and if this value is a constant value Q ′, the above equation becomes

$$\oint (\nabla_\alpha + D_\beta) \cdot \dot{\Phi}(\beta,\alpha)\, dS_\alpha = PQ' = PMq_0c$$

The solution is rough

$$\dot{\Phi}(\beta,\alpha) = P \cdot \frac{Q(\beta)}{S_\alpha}$$

It looks like. Also different to the solution of another general relativity, the conservation of resting momentum cannot be realized only by the path of the moving body, it is an expression that it is established on the Gaussian surface of the coordinates. Although the movements can be expressed by the formulas so far, this writing style was proposed for consistency with De Broglie's law.

17 Another general relativity for motion with vectors other than the direction of inertial acceleration

So far, the equation of motion with the initial velocity only in the direction of free fall has been described. This section describes the equations of motion that have vectors other than the bending direction.

First, let us consider how another general relativity behaves in a space that has a constant acceleration only in a certain direction. First, describe the line segment

$$(v_0,v_1,v_2,v_3) = \left(\frac{\partial\lambda_0}{\partial\lambda}, \frac{\partial\lambda_1}{\partial\lambda}, \frac{\partial\lambda_2}{\partial\lambda}, \frac{\partial\lambda_3}{\partial\lambda}\right) = \left(\frac{\partial\lambda_0}{\partial\lambda}, \frac{\partial\lambda v}{\partial\lambda}\cdot\frac{\partial\lambda_1}{\partial\lambda v}, \frac{\partial\lambda v}{\partial\lambda}\cdot\frac{\partial\lambda_2}{\partial\lambda v}, \frac{\partial\lambda v}{\partial\lambda}\cdot\frac{\partial\lambda_3}{\partial\lambda v}\right)$$

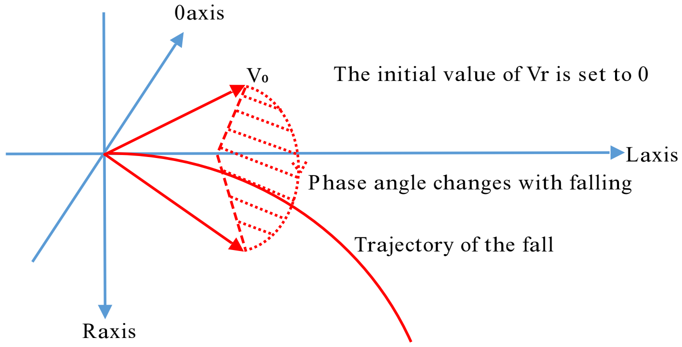
$$(v_0,v_1,v_2,v_3) = (\cos\theta_{01}, \sin\theta_{01}\cos\theta_{12}, \sin\theta_{01}\sin\theta_{12}\cos\theta_{23}, \sin\theta_{01}\sin\theta_{12}\sin\theta_{23})$$

It becomes. Also, if the distortion of the space is only one direction, the dimension does not need to be 4 to express this motion, but 3 dimensions is enough

$$(v_0,V_{vr},V_{vl}) = \left(\frac{\partial\lambda_0}{\partial\lambda}, \frac{\partial\lambda vr}{\partial\lambda}, \frac{\partial\lambda vl}{\partial\lambda}\right) = \left(\frac{\partial\lambda_0}{\partial\lambda}, \frac{\partial\lambda v}{\partial\lambda}\cdot\frac{\partial\lambda vr}{\partial\lambda v}, \frac{\partial\lambda v}{\partial\lambda}\cdot\frac{\partial\lambda vl}{\partial\lambda v}\right)$$

$$(v_0,V_{vr},V_{vl}) = (\cos\theta_{01}, \sin\theta_{01}\cos\theta_{rl}, \sin\theta_0\sin\theta_{rl})$$

Is the coordinate system. As shown in the figure



It looks like this.

Now consider acceleration. There is a distance λ in the four-dimensional direction other than the distance in the three-dimensional direction. Since the space is curved only in the direction of the R axis, the speed in the direction of the L axis doesn't change until the three-dimensional speed becomes the speed of light.（At the speed of light, all vectors exist in the 2D plane of the L-

R plane.） Therefore, it is considered that the changing vector should have a speed $\frac{\partial \lambda vr}{\partial \lambda}$ other than the L direction. This velocity is the decomposition component of the four-dimensional velocity into the R-0 plane. Until now, all four-dimensional velocities were moving in the direction in which space was distorted. From this time, a component in the undistorted direction is also generated, and it is necessary to consider a component that does not accelerate even if it advances in the four-dimensional distance. If the movement in the distorted direction is $\frac{\partial \lambda vr}{\partial \lambda}$ and the movement in the undistorted direction is $\frac{\partial \lambda vl}{\partial \lambda}$

$$\left(\frac{\partial \lambda r}{\partial \lambda}\right)^2 + \left(\frac{\partial \lambda vl}{\partial \lambda}\right)^2 = \left(\frac{\partial \lambda}{\partial \lambda}\right)^2$$

The relationship holds. It is assumed that the phase angle changes by a amount with respect to the movement of λr to the R-0 plane.

In order to execute this Lorentz transformation, the value of the coordinate system is transformed.

$$(v_0, V_{vr}, V_{vl}) = \left(\frac{\partial \lambda_0}{\partial \lambda}, \frac{\partial \lambda vr}{\partial \lambda}, \frac{\partial \lambda vl}{\partial \lambda}\right) = \left(\frac{\partial \lambda_0}{\partial \lambda}, \frac{\partial \lambda v}{\partial \lambda}\cdot\frac{\partial \lambda vr}{\partial \lambda v}, \frac{\partial \lambda v}{\partial \lambda}\cdot\frac{\partial \lambda vl}{\partial \lambda v}\right)$$

$$= \left(\frac{\partial \lambda_0}{\partial \lambda r}\cdot\frac{\partial \lambda r}{\partial \lambda}, \frac{\partial \lambda vr}{\partial \lambda r}\cdot\frac{\partial \lambda r}{\partial \lambda}, \frac{\partial \lambda vl}{\partial \lambda}\right)$$

$$= (\cos\theta_{01}\cos\theta_{12}, \sin\theta_{01}\cos\theta_{12}, \sin\theta_{12})$$

$$\left(\frac{\partial \lambda r}{\partial \lambda}\right)^2 + \left(\frac{\partial \lambda vl}{\partial \lambda}\right)^2 = \cos^2\theta_{12} + \sin^2\theta_{12} = \left(\frac{\partial \lambda}{\partial \lambda}\right)^2$$

$$\left(\frac{\partial \lambda_0}{\partial \lambda r}\right)^2 + \left(\frac{\partial \lambda vr}{\partial \lambda r}\right)^2 = \cos^2\theta_{01} + \sin^2\theta_{01} = \left(\frac{\partial \lambda r}{\partial \lambda r}\right)^2$$

This is consistent with the conventional coordinate system, but the way that the variables are placed is different. In this coordinate system, the phase is converted by λvr while setting the parameter to λr. Here, the equation is written as $\frac{\partial \lambda vr}{\partial \lambda r} = g\lambda vr$.

$$\frac{\partial \lambda vl}{\partial \lambda} = \text{const} \qquad \left(\frac{\partial \lambda v}{\partial \lambda} \leqq c\right)$$

$$\frac{\partial \lambda vr}{\partial \lambda r}\cdot\frac{\partial \lambda r}{\partial \lambda} = \sin\left(sin^{-1}\frac{\partial \lambda vr_0}{\partial \lambda r_0} - sin^{-1} g\lambda vr\right) \cos\left(cos^{-1}\frac{\partial \lambda r_0}{\partial \lambda}\right) \qquad (\lambda v \leqq c)$$

$$\frac{\partial \lambda_0}{\partial \lambda r}\cdot\frac{\partial \lambda r}{\partial \lambda} = \cos\left(sin^{-1}\frac{\partial \lambda vr_0}{\partial \lambda r_0} - sin^{-1} g\lambda vr\right) \cos\left(cos^{-1}\frac{\partial \lambda r_0}{\partial \lambda}\right) \qquad (\lambda v \leqq c)$$

The formula is as follows. That is, the four-dimensional momentum is divided into two directions (0−Vr Vl), and (0−Vr) is further divided into two directions. Thereafter, the phase angle is converted in the direction of the component $\frac{\partial\lambda vr}{\partial\lambda r}$ in which the space is distorted, and the velocity is changed. This equation holds when the three-dimensional speed is less than the speed of light, and when the speed exceeds the speed of light, the rest mass of the moving body becomes zero. So it is assumed that the equation of the Doppler effect of light is applied.

We have described the equation of motion with all components in the simple case. Based on this, the equation of motion for Gaussian field is described. The components of the movement are as described above

$$(v_0, V_{vr}, V_{vl}) = \left(\frac{\partial\lambda_0}{\partial\lambda}, \frac{\partial\lambda vr}{\partial\lambda}, \frac{\partial\lambda vl}{\partial\lambda} \right) = \left(\frac{\partial\lambda_0}{\partial\lambda}, \frac{\partial\lambda v}{\partial\lambda}\cdot\frac{\partial\lambda vr}{\partial\lambda v}, \frac{\partial\lambda v}{\partial\lambda}\cdot\frac{\partial\lambda vl}{\partial\lambda v} \right)$$

$$= \left(\frac{\partial\lambda_0}{\partial\lambda r}\cdot\frac{\partial\lambda r}{\partial\lambda}, \frac{\partial\lambda vr}{\partial\lambda r}\cdot\frac{\partial\lambda r}{\partial\lambda}, \frac{\partial\lambda vl}{\partial\lambda} \right)$$

$$= (\cos\theta_{01}\cos\theta_{12}, \sin\theta_{01}\cos\theta_{12}, \sin\theta_{12})$$

it becomes. However, $\frac{\partial\lambda vr}{\partial\lambda}$ is the velocity to the mass direction. It is assumed that the curvature of the space occurs with respect to $\frac{\partial\lambda vr}{\partial\lambda r}$ as in the above-described calculation formula. The only difference is that the vector in the V_{vl} direction has no conservation and changes according to the falling speed. If only the falling component is expressed by the formula

$$\frac{\partial\lambda vr}{\partial\lambda r}\cdot\frac{\partial\lambda r}{\partial\lambda} = \sin\left(sin^{-1}\frac{\partial\lambda vr}{\partial\lambda r} + sin^{-1}\frac{\partial\lambda vr_0}{\partial\lambda r_0} + sin^{-1}\theta_{01}(\lambda r) \right) \cos\left(cos^{-1}\frac{\partial\lambda r}{\partial\lambda} + cos^{-1}\frac{\partial\lambda r_0}{\partial\lambda} \right) \text{----①}$$

($sin^{-1}\frac{\partial\lambda vr}{\partial\lambda r}$: Actual V_r speed $sin^{-1}\frac{\partial\lambda vr_0}{\partial\lambda r_0}$: Vr initial speed $sin^{-1}\theta_{01}(\lambda r)$: Spatial distortion

$cos^{-1}\frac{\partial\lambda r}{\partial\lambda}$: Combined vector of actual V_0 and V_{vr} $cos^{-1}\frac{\partial\lambda r_0}{\partial\lambda}$: Initial velocity of composite vector of V_0 and Vvr)

It looks like this. There is no component whose value does not change unlike the case of parabolic motion, and the only constraints are that the four-dimensional velocity is the speed of light and that the space is bent in the direction of the central field. As an interaction with the change due to the bending of the space, the equation should be such that each component fluctuates while keeping the four-dimensional speed of light. For the time being, to find an equation, let's look for an equation in which ① is a solution. Assume that ① is the first term of line segment

$$\sqrt{\left(\frac{\partial\lambda vr}{\partial\lambda r}\cdot\frac{\partial\lambda r}{\partial\lambda} \right)^2 + \left(\frac{\partial\lambda vl}{\partial\lambda} \right)^2} = \frac{\partial\lambda v}{\partial\lambda}$$

At that time, there exists a coordinate α that becomes ① when differentiated. For that reason

$$\alpha = \cos\left(sin^{-1}\frac{\partial\lambda vr}{\partial\lambda r} + sin^{-1}\frac{\partial\lambda vr_0}{\partial\lambda r_0} + sin^{-1}\theta_{01}(\lambda r) \right) \cos\left(cos^{-1}\frac{\partial\lambda r}{\partial\lambda} + cos^{-1}\frac{\partial\lambda r_0}{\partial\lambda} \right)$$

$$= \sin\left(sin^{-1}\frac{\partial\lambda vr}{\partial\lambda r} - cos^{-1}\frac{\partial\lambda vr_0}{\partial\lambda r_0} + sin^{-1}\theta_{01}(\lambda r) \right) \cos\left(cos^{-1}\frac{\partial\lambda r}{\partial\lambda} + cos^{-1}\frac{\partial\lambda r_0}{\partial\lambda} \right)$$

And can be transformed. Also

$$\alpha = \sin\left(sin^{-1}\frac{\partial\lambda vr}{\partial\lambda r} - cos^{-1}\frac{\partial\lambda vr_0}{\partial\lambda r_0} + sin^{-1}\theta_{01}(\lambda r) \right) \cos\left(cos^{-1}\frac{\partial\lambda r}{\partial\lambda} + cos^{-1}\frac{\partial\lambda r_0}{\partial\lambda} \right) \text{----②}$$

$$\frac{\partial\Phi}{\partial\alpha} = 0$$

Can be considered. Here, the meaning of equation ① is considered. $cos^{-1}\frac{\partial\lambda vr_0}{\partial\lambda r_0}$ is the one that sets the 0-direction component of the initial velocity of the 0-Vr component of the initial velocity to 0, It is considered that $\cos^{-1}\frac{\partial\lambda r_0}{\partial\lambda}$ directs all vector directions to the 0-Vr direction. In other words, the transformation is the same as the differentiation on the light-velocity falling axis described in Section 15. However, since the information of the initial velocity in the λ_l direction is held, the conditions are included when finding the solution. Also, the β-axis differential operator for finding the basis of the waveform is considered in the same way.

$$\beta^2 = \cos^2\left(sin^{-1}\frac{\partial\lambda vr}{\partial\lambda r} - cos^{-1}\frac{\partial\lambda vr_0}{\partial\lambda r_0} + sin^{-1}\theta_{01}(\lambda r) \right) \cos^2\left(cos^{-1}\frac{\partial\lambda r}{\partial\lambda} + cos^{-1}\frac{\partial\lambda r_0}{\partial\lambda} \right)$$

$$+ \sin^2\left(cos^{-1}\frac{\partial\lambda r}{\partial\lambda} + cos^{-1}\frac{\partial\lambda r_0}{\partial\lambda} \right)$$

$$\frac{\partial\Phi(\alpha,\beta)}{\partial\beta} = \frac{\partial\Phi(\beta)}{\partial\beta} = \Phi'(\text{const})$$

It becomes something to say. This means that differentiation is performed at the stationary coordinates as in section 15. To summarize as an expression.

$$(v_0, V_{vr}, V_{vl}) = \left(\frac{\partial\lambda_0}{\partial\lambda}, \frac{\partial\lambda vr}{\partial\lambda}, \frac{\partial\lambda vl}{\partial\lambda} \right) = \left(\frac{\partial\lambda_0}{\partial\lambda r}\cdot\frac{\partial\lambda r}{\partial\lambda}, \frac{\partial\lambda vr}{\partial\lambda r}\cdot\frac{\partial\lambda r}{\partial\lambda}, \frac{\partial\lambda vl}{\partial\lambda} \right)$$

$$= (\cos\theta_{01}\sin\theta_{12}, \sin\theta_{01}\cos\theta_{12}, \sin\theta_{12})$$

$$\alpha = \sin\left(sin^{-1}\frac{\partial\lambda vr}{\partial\lambda r} - cos^{-1}\frac{\partial\lambda vr_0}{\partial\lambda r_0} + sin^{-1}\theta_{01}(\lambda r) \right) \cos\left(cos^{-1}\frac{\partial\lambda r}{\partial\lambda} + cos^{-1}\frac{\partial\lambda r_0}{\partial\lambda} \right)$$

$$\beta^2 = \cos^2\left(sin^{-1}\frac{\partial\lambda vr}{\partial\lambda r} - cos^{-1}\frac{\partial\lambda vr_0}{\partial\lambda r_0} + sin^{-1}\theta_{01}(\lambda r) \right) \cos^2\left(cos^{-1}\frac{\partial\lambda r}{\partial\lambda} + cos^{-1}\frac{\partial\lambda r_0}{\partial\lambda} \right)$$

$$+ \sin^2\left(cos^{-1}\frac{\partial\lambda r}{\partial\lambda} + cos^{-1}\frac{\partial\lambda r_0}{\partial\lambda} \right)$$

$$\oint (\nabla_\alpha + D_\beta) \cdot \dot{\Phi}(\beta,\alpha) dS_\alpha = \Phi S_\alpha = P(QS_\alpha)$$

$$QS_\alpha = Q'$$

$$\oint(\nabla_\alpha + D_\beta)\cdot\dot{\Phi}(\beta,\alpha)dS_\alpha = P(QS_\alpha) = PQ' = PMqc$$

This is the general formula of another general relativity. As you can see, it has a shape very similar to Dirac's equation.

17 Relativity and early quantum mechanics

In the previous chapter, we described one form of the general formula of another general relativity pursuing the simplicity of the formula. This section describes relativity and early quantum mechanics. The relation between momentum and resting momentum in another general relativity was similar to Poisson bracket. Therefore, when the calculation is performed, it is understood that such a property is often present. Let's start with de Broglie's law.

$$\oint p d\lambda = nh$$

When the momentum is in a steady state and is rotating around a mass, it can be considered as a wave. Then, when the wave of the momentum in the steady state is integrated along the path, it becomes an integral multiple of the Planck constant. This is applied to the theory of relativity.

$$\oint p d\lambda = \oint (m_0 c) d\lambda = \oint \frac{(m_0 c^2)}{c} d\lambda = \oint \frac{E}{c} d\lambda = nh$$

$$\oint E\, d\lambda = nhc$$

It can be understood that such a relationship can be converted. Since p is considered to be a four-dimensional momentum, E is always constant with respect to the traveling direction when considering another general relativity theory. If you transform the formula based on that

$$E = \frac{nhc}{\lambda} = \frac{nhc}{ct_0} = \frac{nh}{t_0}$$

Here, if it is the period when the object makes one round of the mass field,

$$E = \frac{nh}{T_0} = nh\nu \quad (\nu : \text{Frequency})$$

It is an equation that is the energy of quantum mechanics and the energy of photons. In other words, rewriting De Broglie's theorem a little.

$$\oint E\, dT_0 = \oint m_0 c^2 dT_0 = nh$$

Furthermore, the relationship between momentum and Planck's constant is

$$p = \frac{E}{c} = \frac{nh\nu}{c} = \frac{nh}{\lambda}$$

It is possible to easily find the basic properties for obtaining various general formulas of quantum mechanics. In the case of motion that is not an inertial frame, the value of E changes according to the second law of motion in another general theory of relativity. Also, the existence of one quantum can be expressed as 1, assuming that the four-dimensional momentum is always constant and the energy is discrete in the inertial motion system, if the minimum unit is set to 1, it can be considered that it can be considered as a probability. But its essence is the law of conservation of energy. Here, please recall the energy formula of another general relativity.

$$\frac{1}{2}E = E_0 + E_v = \left(\frac{1}{2}m_0c^2 - \frac{1}{2}m_0v^2\right) + \left(\frac{1}{2}m_0v^2\right)$$

Considering this $\frac{1}{2}E$ as E', it is considered to be the energy of the positive matter, and $p = \frac{nh}{\lambda}$ is applied.

$$\lambda = \frac{h}{\sqrt{2m_0(h\nu - E_0)}}$$

It can be applied directly to the formula that Schrodinger's equation is based. Schrodinger's equation was said to be non-relativistic, but in fact it is somewhat relativistic. The theory of quantum mechanics which were born by deforming the Newtonian Hamiltonian so as to match blackbody radiation, and another relativity born according to the rules of Newtonian dynamics calculation and the law of invariance of light speed, can be said to be exactly the same theory.

18 Relativity and Heisenberg's equation of motion

Now that we have derived the basic properties of quantum mechanics from the theory of relativity, I will consider Heisenberg's equation of motion, one of the general equations of quantum mechanics.

$$\frac{dp}{dt} = -\frac{2\pi i}{h}(pH - Hp) \qquad \frac{dq}{dt} = -\frac{2\pi i}{h}(qH - Hq)$$

Is Heisenberg's equation of motion. Looking at this equation, it can be seen that it is very similar to the equation of the law of another theory of relativity. The three-dimensional force Fv in special relativity is

$$\frac{dp}{dt}= \gamma^3 m_0\frac{dv}{dt_0}= m_0c\ \cosh\theta_h\gamma\ \frac{\partial\theta}{\partial\lambda}\ = m_0c\ \cosh\theta_h\frac{\partial\theta_h}{\partial\lambda}$$

Here, assuming that the phase angle θ_h is $(\theta_{hp}-\theta_{hq})$, dividing into the original momentum p and the position momentum q that changes the momentum

$$\frac{dpv}{dt}= \gamma^3\ m_0\frac{dv}{dt_0}= m_0c(\cosh(\theta_{hp}-\theta_{hq}))\frac{d(\theta_{hp}-\theta_{hq})}{d\lambda}\ = m_0c(\cosh\theta_{hp}\ \cosh\theta_{hq}-\sinh\theta_{hp}\ \sinh\theta_{hq})\frac{d(\theta_{hp}-\theta_{hq})}{d\lambda}$$

$$=\frac{1}{q}(p\cosh\theta_{hp}\ q\cosh\theta_{hq}-p\sinh\theta_{hp}\ q\sinh\theta_{hq})\frac{d(\theta_{hp}-\theta_{hq})}{d\lambda}$$

It becomes. This means that elementary particles orbiting in a certain orbit in an inertial state receive energy and move to a slightly higher energy state, where they pass through an unstable geodesic line. And on the geodesic line, it is assumed that (θhp-θhq) makes a periodic motion with the relation of $2\pi\nu t_0$, and assuming that q is momentum related to position, the relational expression of q = nhνc can be substituted.

$$\frac{dpv}{dt}=\frac{c}{nh\nu}\ (pq-(qv)\ (pv))\ \frac{1}{c}\ 2\pi\nu \qquad \frac{dpv}{dt}=\frac{2\pi}{nh}\ (pq-(qv)\ (pv))$$

$$\frac{dp_0}{dt}=\frac{c}{nh\nu}\ (p(qv)-q(pv))\ \frac{1}{c}\ 2\pi\nu \qquad \frac{dp_0}{dt}=\frac{2\pi}{nh}\ (p(qv)-q(pv))$$

p:4D momentum of moving body   pv:Exercise amount

q:Four-dimensional spatial momentum of force field   qv:Spatial momentum of force field

It is a form very similar to Heisenberg's equation of motion. However, since there is no agreement, it will be a future consideration. As mentioned above, the spatial momentum of the force field exists in space based on Gauss's theorem. The result of moving with its distribution and phase matched is inertial motion. However, this formula is an unstable force calculation because it is a special theory of relativity. It is thought that the unstable force drops to a stable level immediately after moving to the next higher energy level. Calculation of stable force becomes another general relativity.

$$F_0\ =\ \frac{\partial p_0}{\partial t_0}\ =-m_0c\sin\Delta\theta\frac{\partial(\Delta\theta)}{\partial t_0}\ = -m_0c\frac{\partial(\Delta\theta)}{\partial t_0}\left(\ sin\theta p cos\theta q\ +\ cos\theta p sin\theta q\ \right)$$

$$= -\ \frac{1}{q}\ \frac{\partial(\Delta\theta)}{\partial t_0}\left(\ pvq_0+\ q_0pv\ \right) =-\frac{2\pi}{nh}\left(\ pvq_0+\ q_0pv\ \right)$$

$$Fv\ =\ \frac{\partial pv}{\partial t_0}\ =\ m_0c\cos\Delta\theta\frac{\partial(\Delta\theta)}{\partial t_0}\ = -m_0c\frac{\partial(\Delta\theta)}{\partial t_0}\left(\ cos\theta p cos\theta q\ +\ sin\theta p sin\theta q\ \right)$$

$$= -\ \frac{1}{q}\ \frac{\partial(\Delta\theta)}{\partial t_0}\left(\ p_0q_0+(qv)(pv)\ \right) =-\frac{2\pi}{nh}\left(\ p_0q_0+(qv)(pv)\ \right)$$

It looks like this. This should be the equation for calculating the force that creates a stable state. In this equation, the phase angle is changed to $\Delta\theta = (\theta p + \theta q)$. This is because the time derivative of $(\theta p - \theta q)$ becomes 0, so that it is changed to $(\theta p + \theta q)$ to do a periodic function. These equations have only described the results of the calculations, but have not yet been checked to see if they match the actual values. That will be a future consideration.

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website

http://www.wannyan.net/scidog/webmaster.htm

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etc

Apology

I'm sorry, I can’t use English, then this paper is written by google translation.

If this paper has weird English translation, for that reason I can hand over the Japanese paper to need.