

The Deficiency in the Principle of Equivalence and the Need for Alternatives⁽¹²⁾

- Energy and mass cannot be converted interchangeably. -

Young sik, Kim *

Abstract

1. In Einstein's Special Theory of Relativity, mass and energy are assumed to have equivalent values, and the "equivalence principle of mass and energy($E = mc^2$)" was introduced. Under this, the mass of a moving object increases as much as the kinetic energy. Therefore, the effect of kinetic energy(v) is expected to be stopped in the following process where mass is increased. However, even if the mass of a moving object increases in the actual phenomenon, the initial speed of motion is maintained. In other words, kinetic energy was not converted to mass.

2. In the process of expressing the momentum($P = m \times v$) of an object, the role of mass(m) and the role of kinetic energy(v) are individually required. Here, mass and kinetic energy have a dependent relationship. With this, they cannot be interchangeably converted from one form to another. As a result, the "equivalence principle of mass and energy" is not established. In fact, the increase in mass does not necessarily mean a sacrificial annihilation of kinetic energy.

3. In Einstein's equivalence principle, the unknown effect is misinterpreted as an increase in mass. For instance, the inertia of a moving object responds to external kinetic energy with low efficiency. In case of the low efficiency of inertia, it can be misunderstood that mass has increased.

PACS number; 02.30.Em, 03.30.+p, 05.20.Dd, 14.80.-j, 31.30.-i,

Keywords; Special Theory of Relativity, equivalence principle, elementary particles, mass, inertial force, kinetic energy,

* **E-mail;** batangs@naver.com

Sequence

- I. Introduction
- II. Body
 1. The structure of elementary particles and the misconceptions on mass
 2. The expression and operational principles of inertial force
- III. Conclusion
- IV. References of the Cyber site

I . Introduction

In Einstein's Special Theory of Relativity, mass and energy are assumed to have equivalent values, and the "equivalence principle of mass and energy" was introduced. If we indicate energy as E , mass as m , and the velocity of light as c , then the relationship between mass and energy can be expressed as $E=mc^2$. Therefore, mass and energy can interchangeably be converted from one form to another.

If kinetic energy(E) is changed into mass(m) then the mass of a moving body would increase in proportion to $\gamma = \frac{1}{\sqrt{1 - \frac{V^2}{C^2}}}$ (Lorentz coordinate transformation) and this is expressed in the form of $m' = m \times \gamma$. Therefore, the moving body should have an additional mass of $m' - m$. Also, after the increase in the mass of the moving body, the initial velocity is expected to disappear, because all factors of kinetic energy is converted into the form of mass.

However, in reality(circumstances), even if the mass of a moving body increases, the initial velocity is maintained. The steadiness of the initial velocity implies that kinetic energy is not converted into mass. In other words, the unexplained mysterious effect is misunderstood as an increase

in mass.^[11] <<http://batangs9.com/E-11.pdf>>

In the equivalence principle from the Theory of Relativity, the increase in mass has been predicted without the removal of the effect of kinetic energy(v). It means that the "increase in mass" and the "steadiness of velocity" are allowed simultaneously. In the theory, the role of kinetic energy would be repetitively reflected. Therefore, the process of converting kinetic energy into mass can be repeated indefinitely. With this fact, the equivalence principle has the following contradiction in circulation logic.

From the view of the equivalence principle, when a moving object with mass(m) moves at velocity(v), its mass increases to $m' = m \times \gamma$ and the momentum is expressed as $Q = m' \times v$. Also, if the moving body with mass $m' = m \times \gamma$ maintains its initial velocity(v), the mass would increase to $m'' = m' \times \gamma$ and the momentum would be $Q' = m'' \times v$. Moreover, if an object with a mass of $m'' = m' \times \gamma$ maintains its initial velocity(v), then the mass increases to $m''' = m'' \times \gamma$ and the momentum is $Q'' = m''' \times v$.

However, in reality, a moving object continues to maintain its initial velocity without increasing its mass infinitely. In other words, in the process of the increase in mass, kinetic energy(v) is not consumed sacrificially. To get rid of this logical confusion, one has to separate the "increase in mass" and the "steadiness of velocity" and develop an independent stand toward them.^[11] <<http://batangs9.com/E-11.pdf>>

In the body of this thesis, I will elaborate why the interchangeable conversion of mass and energy(energy \rightarrow mass, mass \rightarrow energy) is impossible. I will also point out the logical contradiction of the equivalence principle and explore the hidden secret of the formula expressed in it. Moreover, I will explain the principle of operation in which inertial force is reduced in

the motion process of an object from the point of actual function.

II. Body

1. Structure of elementary particles and the error of the equivalence principle

In general physics, all objects are assumed to have their inherent mass. However, the existence of mass has only been confirmed through the inertia of mechanical function, and to this day, it has no other means of expression. In addition, the actual factors(element, raw material) of mass have not yet been detected directly.

Up to now, the identity of mass is not yet clear. In other words, we only know the word mass by definition, but we have insufficient knowledge on mass. Like stereotypes in general physics, in cases wherein we perceive that an object has its inherent inertia, it can be assumed that the mass of the material element exists as much as its inertial force. Here, mass can be an alternative to inertia and the use of mass means the application of the inertial force.

Mass and inertia are not distinguished in terms of functions from the point of mathematical logic(expression). Mass and inertia are also proportional. Therefore, although one uses mass as an alternative to inertia, it is possible to overlook the existence and role of inertia without confusion. The mathematical logic is only symbolic and has a superficial meaning. This will not help us to understand the collaborative principle of operation between mass and inertia.^[11] <<http://batangs9.com/E-11.pdf>>

The elements of mass and the functions of inertia exist in totally different forms. In addition, mass(element) and inertia(function) do not share common features and have different medium. The mass and inertia of these conditions cannot be causally connected.

In Einstein's Theory of Relativity, the relationship between mass(m) and energy(E) can be expressed as $E=mc^2$. Here, the square of the velocity of light(c^2) is a compatibility constant. However, since it has the unit of quality metrics(m, sec), it cannot have the function of compatibility constant. Moreover, the value of compatibility constant changes depending on the selection of Km/sec or m/sec for the velocity of light(c).

In the Theory of Relativity, not only did the paper misunderstood the identity of mass and inertia, but also introduced the **"equivalence principle of mass and energy"** which presupposes the relation between mass and inertia. However, mass and inertia do not have a causal connection, and cannot be converted interchangeably($energy \rightarrow mass, mass \rightarrow energy$). This confusion implies that the process of formation of the **"equivalence principle of mass and energy"** has a hidden mysterious secret($distortion$).^[11]
<<http://batangs9.com/E-11.pdf>>

In the quantum mechanics of modern physics, the Higgs Theory is introduced to conveniently interpret the collaborative principle of operation between mass and inertia. Based on the premises of Higgs Theory, elementary particles and Higgs must have extra additional work energy. However, Higgs Theory which requires an additional intervention of work energy has not been proven experimentally, and does not give us a fundamental understanding of mass and inertia.

In Einstein's General Theory of Relativity, the working principle of gravity has been interpreted in terms of the concept of mass at the object level. This was derived from Newtonian mechanics which do not recognize the existence of elementary particles. Therefore, Einstein's theory of gravity is as simple as Newtonian mechanics. The minute functions of elementary particles and their role cannot be reflected in the concept of mass at the object level. If the existence of elementary

particles is known, the gravitational theory which reflects the functions of elementary particles should be investigated instead of choosing the concept of mass at the object level.^[1] <<http://batangs9.com/E-1.pdf>>

All matter are composed of elementary particles such as protons, neutrons, and electrons, and these particles have inherent inertia. This is expressed as the characteristics of elementary particles. Therefore, the inertia of objects should be divided into units of elementary particles. In addition, the working principle of inertia must be interpreted from the viewpoint of the elementary particle level(unit).

Like the paper "The Constituent Elements in Outer Space and the Condition of the Existence of Light Waves" which was introduced earlier, space is filled with the medium of light waves. The medium of light waves is called ether in classical physics. However, to distinguish ether in classical physics, I define the medium of light waves as "batangs" in this paper.^[6] <<http://batangs9.com/E-6.pdf>>

In space full of batangs, all elementary particles retain their "autonomous vibration" of contraction and expansion permanently. In addition, the vibrational energy of elementary particles acts in the current process, and its form is maintained by the role of vibrational energy. The conditions and working principles to retain "autonomous vibration" permanently for all elementary particles are found and explained in detail in "The Structure and Active Functions of Elementary Particles" which was introduced earlier.^[7] <<http://batangs9.com/E-7.pdf>>

When elementary particles retain their autonomous vibration of contraction and expansion, the diameter(volume) and elasticity of elementary particles can change periodically. In other words, elementary particles will have a small diameter and large elasticity under the

contracted state while they will have a big diameter and small elasticity under the expanded state. This periodic change in elasticity can be misinterpreted as the presence of various size of paton inside the proton like Feynman and Partons.

In the course of motion of elementary particles in autonomous vibration, the momentum and position of elementary particles are not clearly represented. Therefore, they could be misunderstood as having an uncertain range like W. Heisenberg's uncertainty principle.

As described earlier in the paper entitled "**Fictional Perception of Mass and Inertia**", the vibrational energy in space produces a reaction with respect to space(**batangs**), and this reaction of vibrational energy is expressed as "**inertia**" of mechanical resistance function. If an elementary particle of autonomous vibration yields to the inertia of the resistance function, this might be mistaken for the existence of mass of material elements inside the elementary particle. However, the elementary particle of autonomous vibration does not possess "**mass**" of the material element. In other words, "**mass**" of the material elements from the viewpoint of general physics is a fictional element that does not exist.^[11]

<<http://batangs9.com/E-11.pdf>>

The vibrational energy of elementary particles and external kinetic energy have the same type of mechanical function. Inertia is also expressed by the vibrational energy of elementary particles. As a result, inertia(**vibrational energy**) and external kinetic energy can be compared with the same values. From now on, the equivalence of inertia and kinetic energy will be referred to as the "**equivalence principle of inertia and energy**". "**The equivalence principle of inertia and energy**" can explain the relationship between inertia and kinetic energy in terms of substantive function.

The kinetic energy provided to elementary particles of autonomous vibration will be stored(*conservation*) through the inertia of elementary particles. For example, the inertia of elementary particles(*vibrational energy*) and external kinetic energy have functional continuity, and can be synthesized into a single vector. This synthesis determines the momentum of elementary particles. In other words, the momentum of elementary particles is proportional to inertia and velocity.

When the vibrational energy of elementary particles and the external kinetic energy(*v*) are synthesized as a single vector, the action of vibrational energy is concentrated tendentially, and the autonomous vibration of the transformation structure is permanently retained. Maintaining the autonomous vibration of the transformation structure means the controlled conservation of kinetic energy. In addition, the kinetic energy which is conserved inside the elementary particle always acts in the current process. It means that the elementary particle preserves the kinetic energy that acts in the current process.

When an elementary particle continues its autonomous vibration in the transformation structure, the working distance of the vibrational energy is repeatedly extended to one direction while contracting in the opposite direction. Therefore, the batangs of space which are used as the medium of vibrational energy inside the elementary particles are tendentially replaced. Moreover, because of the biased replacement, the spatial displacement of elementary particles is made autonomously(*active*). The autonomous displacement of elementary particles means "**inertial motion**" of uniform velocity.^[11] <<http://batangs9.com/E-11.pdf>>

Elementary particles in autonomous vibration move through the exchange of medium. However, the batangs of space which is used as a medium of vibrational energy always maintains its position. In addition,

the autonomous inertial motion of elementary particles proceeds permanently until it reaches the final boundary of the universe. It means that elementary particles of autonomous vibration are not transferred in the form of transport like a baseball. The conditions and the working principle of **"inertial motion"** of elementary particles will be explained in detail in the next paper called **"The Active Functions of Elementary Particles and the Principle of Motion"**.

The system and shape of elementary particles are maintained by the mechanical function of vibrational energy. When the shape of elementary particles collapses, light wave energy is released. This effect is the result of the conversion of vibrational energy, originally stored inside elementary particles, to light wave energy. However, when the light wave energy is damaged, the light wave energy at the speed of light is converted into stationary vibrational energy, and forms the shape of elementary particles.

In the collapse process of elementary particles, vibrational energy and light wave energy have morphological compatibility(change of state). Also, the vibrational energy of elementary particles is expressed as inertia. Inertia and light wave energy of elementary particles can be said to have equal values. Therefore, the effect of releasing light wave energy in the collapse process of elementary particles should be interpreted from the point of the **"equivalence principle of inertia and energy"**.^[11]

<<http://batangs9.com/E-11.pdf>>

2. The inertia of elementary particles in motion has low efficiency.

As described in the paper **"Flaws in the Special Theory of Relativity and the Formulation of Absolute Theory"** introduced earlier, Einstein introduced the **"Lorentz Transformation"** to illustrate the physical quantity

of a moving object(or observer). However, its form is derived based on abnormal conditions and anomalous logic. One might easily understand my opinion through a breakdown of the Lorentz Transformation.^[2]

<<http://batangs9.com/E-2.pdf>>

When $\frac{1}{\sqrt{1-\frac{V^2}{C^2}}}$ from the Lorentz Transformation is broken down

backward, the final result is a summation structure of $C + V$ (or $C - V$)

through the process of $\frac{1}{\sqrt{\frac{C^2}{C^2}-\frac{V^2}{C^2}}}$, $\frac{1}{\sqrt{\frac{C^2-V^2}{C^2}}}$, $\frac{C^2-V^2}{C^2}$, $C^2 - V^2$

In other words, the mathematical basis of the Lorentz Transformation is the summation structure of $C^2 - V^2$. As a result, the summation structure of $C + V$ must exist as a phenomenon.

To establish the summation structure of $C + V$, the C and V of the independent factors must be synthesized into a single vector. Therefore, the summation structure of $C + V$ will have a complete meaning inside one coordinate. From this point of view, the Special Theory of Relativity which sets two coordinate systems of S and S' as relative composition should be discarded.

It might be true that Einstein himself did not recognize it, but what is sure is that the summation structure of $C + V$ is implicitly used in the derivation of the Lorentz Transformation. Also, two velocities of C and V are synthesized in space, and it is presumed that space embraces the summation structure of $C + V$. It means that the summation process of $C + V$ in space is used as the premise. ^[2]

<<http://batangs9.com/E-2.pdf>>

However, it might be hard to believe that the summation process of $C + V$ did not take place in space, but happens in the narrow interior of elementary particles in motion under control. All elementary particles will independently have a motion effect, and the impact of the motion effect is expressed as the characteristics of elementary particles. It means that the two velocities of C and V will act individually inside the elementary particles in motion. We will get to know the internal situation of these elementary particles in motion.

As described in the paper "**The Structure and Active Functions of Elementary Particles**" which was introduced earlier, all elementary particles such as protons, electrons, and neutrons retain their autonomous vibration of contraction and expansion permanently. In other words, the vibrational energy of elementary particles acts in the current process. In addition, the reaction of the vibrational energy should be expressed as the inertia of the resistance function.^[7] <<http://batangs9.com/E-7.pdf>>

The vibrational energy of elementary particles exists by using the batangs of space as the medium and the batangs have the elasticity of the speed of light. If we assume the speed of light of the vibrational energy as 3×10^8 m/sec, and the diameter of a proton as 10^{-15} m, the frequency of the proton is $\frac{3 \times 10^8}{10^{-15}} = 3 \times 10^{23}$. However, it is difficult to verify 3×10^{23} through experiments.

The vibrational energy of elementary particles has a function of work energy which acts in the current process. Moreover, the external kinetic energy provided to elementary particles has a function of work energy in the current process. Therefore, both the vibrational energy and external kinetic energy have functional continuity, and can be synthesized as a single vector. If we assume the speed of light of the vibrational energy

as C and the velocity of elementary particles as V , the two velocities of C and V can be synthesized as $C + V$. It means the vibrational energy of elementary particles in motion will have the summed velocity of $C + V$.

However, in the process of using the batangs of space as a medium, the vibrational energy of $C + V$ must be restored as the general velocity of light in C' . This is because the batangs, which is used as the medium of vibrational energy, possess the elasticity of the speed of light. In other words, space composed of batangs does not allow the summed velocity (super light speed) of $C + V$.

The effect of restoration of the summation structure of $C + V$ into the velocity of light can be expressed as $C + V = C'$ through the process of $(C + V) \rightarrow C'$. "Restored light velocity" of C' and the general light velocity of C act with the same magnitude at 3×10^8 m/sec, and one cannot distinguish them extrinsically. However, not only do these two light velocities have different characteristics, the effects of their functions are also completely different. This is because the "restored light velocity" of C' implicitly embraces the general light velocity of C and the velocity of V .

To establish the equation of $C + V = C'$ normally in the internal property of the vibrational energy, one has to square both sides of $C + V$ and C' like the Pythagorean theorem. $C^2 + V^2$ and C'^2 of both sides are perfectly balanced, and the "light velocity equation" of $C^2 + V^2 = C'^2$ is now established. Also, one can derive $\frac{C'^2 - V^2}{C^2}$ by going through $C^2 = C'^2 - V^2$ and $C^2 + V^2 = C'^2$ of the "the light velocity equation".

The form of the square which was applied during the establishment process of "light velocity equation" can be restored to its original form by applying the square root to both sides. In other words, the form,

$$\sqrt{1 - \frac{V^2}{C^2}}, \text{ can be completed by squaring } \frac{C'^2 - V^2}{C^2} \text{ and arranging the fraction. } \left\{ \frac{C'^2 - V^2}{C^2} \Rightarrow \sqrt{\frac{C'^2 - V^2}{C^2}} \Rightarrow \sqrt{\frac{C'^2}{C^2} - \frac{V^2}{C^2}} \Rightarrow \sqrt{1 - \frac{V^2}{C^2}} \right\}$$

C' 's share with respect to the restored light velocity of C' is expressed as $\sqrt{1 - \frac{V^2}{C^2}}$. In addition, the components of C which are used for C' 's restored light velocity, and those of V are inversely proportional. Therefore, V 's share with respect to the restored light velocity of C' is indicated as $\frac{1}{\sqrt{1 - \frac{V^2}{C^2}}}$.

In the internal properties of the vibrational energy, the role of C decreases at the rate of $\sqrt{1 - \frac{V^2}{C^2}}$. Therefore, the function of the vibrational energy which contains the light velocity of C can be weaker with the rate of $\sqrt{1 - \frac{V^2}{C^2}}$. This results in the decrease in density (pressure, potential energy) of the vibrational energy. Thus, the vibrational energy of elementary particles in motion will have a weak force.^[8] <<http://batangs9.com/E-8.pdf>>

If the vibrational energy of elementary particles in motion is applied with a weak force, inertia, electric force, and nuclear force produced by the vibrational energy would have low efficiency. In other words, inertia, electric force, and nuclear power will act in low efficiency with respect

to the external action. The effect of inertia, electric force, and nuclear power at low efficiency can be misinterpreted as the increase in "mass of the material element" like the equivalence principle from the special theory of relativity.

My argument that the inertia of elementary particles in motion will have low efficiency can be easily understood through the effect wherein the moving direction of elementary particles will not be interrupted by external kinetic energy. It means that although external kinetic energy is provided with regards to elementary particles of the semi-light velocity in which the efficiency of inertia is reduced like Synchrotron accelerator, elementary particles of semi-light velocity will have an acceleration slower than the expected measure.

An effect which weakens the inertia of elementary particles must be distinguished from another effect which reduces inertia. For instance, the weakening of inertia during the course of motion, and the reduction of inertia means a lighter object. It means that the weak inertia of a moving body will have low efficiency, and the object with light weight(mass) will have a small inertia.^[11] <<http://batangs9.com/E-11.pdf>>

However, the role of V in the restored light velocity of C' increases

at the rate of $\frac{1}{\sqrt{1-\frac{V^2}{C^2}}}$. Also, velocity V determines how strong

kinetic force is. Here, the strength of kinetic force means the intensity of kinetic energy(energy density, height of position energy). Therefore, the kinetic force of elementary particles with the velocity of V is stronger at the

ratio of $\frac{1}{\sqrt{1-\frac{V^2}{C^2}}}$. In other words, the faster the velocity of V is, the

stronger the kinetic force is, and the higher the efficiency of the kinetic

force by $\frac{1}{\sqrt{1-\frac{V^2}{C^2}}}$.

In the motion process of elementary particles, the action which

increases the efficiency of kinetic force by $\frac{1}{\sqrt{1-\frac{V^2}{C^2}}}$ and another action

which weakens the efficiency of inertia by $\sqrt{1-\frac{V^2}{C^2}}$ are expressed as

the phenomenon(effect) under the same conditions. As a result, if the

efficiency of the kinetic force is increased, it can be misinterpreted as an

increase in the mass of the material elements(inertia) as claimed by the

equivalence principle. The efficiency of movement and the magnitude of

momentum must be strictly distinguished. For instance, the efficiency of

kinetic force increases by $\frac{1}{\sqrt{1-\frac{V^2}{C^2}}}$ and the magnitude of kinetic force

is proportional to inertia.

During the motion process of elementary particles, the efficiency of

inertia becomes lower, and the efficiency of kinetic force becomes higher.

For example, if elementary particles of autonomous vibration move at the

speed of light, the function of inertia will be extinct while kinetic force

acts infinitely.^[2] <<http://batangs9.com/E-2.pdf>>

However, even though the efficiency of inertial force becomes lower

and the efficiency of kinetic force becomes higher, the magnitude of

vibrational energy will not change. In other words, the vibrational energy

of elementary particles always maintains their original magnitude

permanently. Therefore, the internal value(magnitude) of vibrational energy

must be strictly distinguished from external efficiency.

The effect which increases the efficiency of inertia is indicated as **"absolute batang factor"** in my Absolute Theory. The process of derivation of **"absolute batang factor"** in the absolute theory is specifically elaborated in two previously introduced papers, **"Flaws in the Special Theory of Relativity and the Establishment of Absolute Theory"** and **"The Necessity of an Absolute Coordinate and Verification Method"**. Here, **"absolute batang factor"** and **"Lorentz Transformation"** are constructed similarly. However, the derivation of **"absolute batang factor"** and **"Lorentz Transformation"** are totally different and have different physical meanings.^{[2] [5]} <<http://batangs9.com/E-2.pdf>>

<<http://batangs9.com/E-5.pdf>>

III. Conclusion

In Einstein's Theory of Relativity, the paper itself projected that the mass and energy of material elements cannot be converted interchangeably, and introduced the **"equivalence principle of mass and energy"**. The mass of material elements is not real but fictional. Therefore, we cannot accept the **"equivalence principle of mass and energy"** based on the interchangeable conversion of mass and energy.

In the equivalence principle from the theory of relativity, the unknown effect is misinterpreted as an increase in mass. For instance, the inertia of a moving object responds to external kinetic energy at low efficiency. In case wherein the inertia of a moving object has low efficiency, it can be misunderstood that mass has increased.

The inertia of an object can be expressed through the vibrational energy of elementary particles. Also, the inertia of elementary particles and external kinetic energy have the same type of mechanical function

and interact with each other^(effect). Therefore, we can establish the "equivalence principle of inertia and energy" to set the inertia of elementary particles and external kinetic energy with the same value. Based on this result, we would like to replace the "equivalence principle of mass and energy" with the "equivalence principle of inertia and energy".

IV. References of the Cyber site

- [1] young sik, kim. <Flaws of Newton's Mechanics and Distorted Concepts Adopted by Modern Physics>. 2016. (<http://batangs9.com/E-1.pdf>)
- [2] young sik, kim. <The Defect in the Special Theory of Relativity and the Formulation of the Absoluteness Theory>. 2016. (<http://batangs9.com/E-2.pdf>)
- [3] young sik, kim. <Spatial Independence of the Earth's Gravitational Field and Fabrication of the Law of the Constant Speed of Light>. 2016. (<http://batangs9.com/E-3.pdf>)
- [4] young sik, kim. <The Fictional Coordinate Concept in the Special Theory of Relativity and the Search for Another Alternative>. 2016. (<http://batangs9.com/E-4.pdf>)
- [5] young sik, kim. <The Necessity of the Absolute Coordinate System and the Verification Method>. 2016. (<http://batangs9.com/E-5.pdf>)
- [6] young sik, kim. <Elements in Space and the Condition for the Existence of Light Waves>. 2016. (<http://batangs9.com/E-6.pdf>)
- [7] young sik, kim. <The Structure and Active Functions of Elementary Particles>. 2016. (<http://batangs9.com/E-7.pdf>)
- [8] young sik, kim. <Interaction between the Active Functions and Electric Forces of Elementary Particles>. 2016. (<http://batangs9.com/E-8.pdf>)
- [9] young sik, kim. <The formation of atomic structure and mathematical expression>. 2016. (<http://batangs9.com/E-9.pdf>)

[10] young sik, kim. <Active functions of elementary particles and interactions of nuclear force>. 2017. (<http://batangs9.com/E-10.pdf>)

[11] young sik, kim. <Fictional Perception of Mass and Inertial Force>. 2017. (<http://batangs9.com/E-11.pdf>)

*** Difference becomes specialty, Ideal becomes reality,
at the center of world in the name of center**

2017. 4. 8.