A World Told by Ontology

Jason Kuhyun Ryoo

Thesis collection

InnoLab

A World Told by Ontology

Jason Kuhyun Ryoo

Publisher's Note

‘Ontology’, which may sound unfamiliar, actually has a practical and simple meaning. It is a basic understanding of the principles by which all beings in the world ‘become themselves’. Nature is the best teacher in this regard, having trained fundamental and practical wisdom over 13.8 billion years. Since humans are also part of nature, the principles of nature have depth and breadth that apply to both individuals and society. Understanding this has been our long-standing vision. The best science that strictly studies this wisdom of nature using empirical methods is ‘physics’. Physics combines intuitive simplicity and precise logic. The development of physics is directly connected to the development of civilization. Understanding physics leads to the growth of human wisdom. Therefore, physics should continue to develop, and science should be widely shared.

(English version)

A World Told by Ontology

Title:
Time, Space and Existence

Authors: Jason Kuhyun Ryoo

Affiliations: Individual researcher, his private research institute Innolab.
Jason Kuhyun Ryoo *
Innolab, 114-1303, 4-9, Jang sung Baegi_ro, DongJak_gu, Seoul, 06966, Korea

*Corresponding author Jason Kuhyun Ryoo Email: visionreale@gmail.com

November 1, 2024

Seoul, Korea
InnoLab Natural Science Research Institute
visionreale@gmail.com
jasonryoo@naver.com
http://udynamics.net/

Abstract

In physics, the three main elements are time, space, and mass energy. However, a clear definition of time and space has not yet been established. I believe that the lack of a theory on these basic elements is causing many difficulties in physics.

There is still much discussion about the reality of time. Space has also been obscured by time since Einstein, and it feels distant from our senses. However, quantum mechanical ideas are giving us new insights into time and space.

Recently, I studied the 'natural theory of gravity' and conducted fundamental research on time and space. In the process, the reality of space based on quantum field theory gave me an unexpected discovery. Space is actually the center and mother of the universe. Gravity is also a property of space rather than mass.

In addition, the synthesis of quantum theory and philosophical epistemology on time shows that time does not have a physical reality. Therefore, Einstein's space-time was a concept that could not be established essentially. And the fact is that the reality of space and mass energy was more clearly seen when the time dimension was excluded.

I would like to share this new research result with researchers.

I. Time Theory

Definition of the Task

Existence can be proven causally. First, something that does not have a physical basis has no substance. Even if there is a physical basis, if it is not sufficient, its existence is not guaranteed. Existence is always required to have continuity, stability, and homeostasis. Also, the spatial existence of existence can always be confirmed. The existence we want to know can be mostly interpreted and judged by analyzing the material-based pattern it has.

Does time exist?

1. Time is always discovered in the process of interaction between mass energy and space. This is an important reason why we think that time should naturally exist in the physical world. However, this interaction is not a phenomenon created by time, but a property of mass and space. This is the first point of view from which we can judge the existence of time.

2. Time is not a necessary and independently existing entity, nor is it a medium. It is a quantity of measurement that can be measured only when mass and space are needed for their needs. To be precise, time is not a physical quantity but a calculated value. If measurement is not necessary, the existence of time is not necessary. This is because time is sufficient as the present. Except for the time required for energy conversion, most time is the present. The time required for energy conversion is also not a property of time, but a property of mass energy and space.

3. There is fundamental evidence for the non-substantialism of time. Time has neither mass nor energy, which are the ‘existence requirements’ of the quantum world. Also, physical spatial coordinates are always unclear. It is impossible to confirm clear spatial coordinates. There are only fluid coordinates according to human concepts. 4. The theories of quantum theory are mostly unrelated to time and rarely require the dimension of time.

5. If we have physical dimensions and characteristics that we give to time, they are not those of time but inherent properties of space and mass energy. Change does not come from time but from the essence of mass energy and space. Morning is not brought by time, but by the rotation of the Earth and the rising sun.

6. However, time is treated as a substance because it is closely related to our lives. This is because our lives are structured to be very dependent on time. If we understand the physical reality of time, we realize that it is reasonable to reduce our perceptions and judgments that depend too much on time.

7. The past is gone, the future is a projection, and the present is the real world we coordinate.

Philosophical and scientific discussions on the reality of time have been ongoing for a long time. However, if we have not yet reached a conclusion, we need to reach a quick conclusion through active discussion and research. In the era of cutting-edge science, a clear ontological understanding of time will clearly benefit not only general science and engineering, but also politics, economy, society, and culture.

The Only Possessed Time

The only possession for humans is time. Because one's own time is something that only one possesses. That's why time is precious to humans and they have no choice but to live a life dependent on time. If there is no clear concept of time in human society, there is a reason for that. Power tends to try to control space, which is real, through time, which is intangible. Having everyone have a clear concept of time also contributes to social balance.

Time and Einstein's Theory

1. It is against natural principles that time and space expand and contract to match the properties of light. Light simply follows general physical laws.

2. Einstein's theory seems to give special meaning to light. However, light is a general entity with no exceptions. He only said that light has constant velocity, but did not say why it has constant velocity. This is a general tendency in his theory. His scientific method is that he only talks about phenomena in greater depth than others, and does not tell us why.

3 The reason light has constant velocity is simply that it does not have mass. Since it does not have mass, it is not subject to gravitational interference. This is the biggest reason. This is a general property of all electromagnetic waves. All physical entities, including light, are equal in natural principles.

5. His principle of mass-energy equivalence is the most brilliant ontological discovery he made.

6. The idea that spacetime has curvature is a creative idea, but curvature is essentially a property of space and has nothing to do with time. 7. The concept of time is mysterious, and even genius scientists could not be an exception to his temptation.

8. The ADM formulation of general relativity tells us that space-time may not necessarily be a single entity. The separation of space-time can actually simplify calculations and increase efficiency. The expression of Hamiltonian mechanics through the ADM formulation strongly suggests the non-integrity of space-time.

Separation of the dynamic and time dimensions of Hamiltonian equations

The velocity of generalized coordinates and the rate of change of generalized momentum are independent of time. Hamiltonian equations are useful for confirming and proving this. This is because time is completely independent of

the system, so changes can be observed.

Time rate of change of generalized coordinates: $\frac{dq_i}{dt} = \frac{\partial H}{\partial p_i}$

This equation shows that the rate of change of generalized coordinates q_i is equal to the value of the partial differentiation of Hamiltonian H with respect to generalized momentum p_i.

Time rate of change of generalized momentum: $\frac{dp_i}{dt} = -\frac{\partial H}{\partial q_i}$

This equation shows that the rate of change of generalized momentum p_i is equal to the negative sign of the partial differentiation of Hamiltonian H with respect to generalized coordinate q_i.

Hamilton's equation is a tool for monitoring the change of a system over time. It deals with time closely. Users are also sensitive to the flow of time. However, this rather tells us that time and the system are completely separate and unrelated. In other words, Hamilton's equation measures change using 'time', which is unrelated to the system. Change in the system does not occur over time, but is caused by factors of the system itself.

In this way, we often have the habit of looking for causal relationships in time. However, in fact, other than eating and sleeping, there is nothing that has a direct causal relationship with time. In other words, we are dependent on time.

II. Space Theory

Galaxies in space have relatively high density. When we assume that large spheres with large mass move with a certain form of circular motion as the initial value at an appropriate distance, this space can become a ‘natural dynamic system’ that moves in interaction without additional external energy intervention. In particular, space, as quantum field theory suggests, becomes a very ideal fluid space. The extremely low temperature and density of space itself makes it a highly efficient energy carrier that can store, move, convert, and radiate energy without unnecessary resistance or interference.

Up until now, scientific discussions have focused on mass energy, followed by time without substance, and space has been considered a vacuum and not paid attention to. However, in the actual universe, space is the master. Surprisingly, humans are almost unaware of this status of space.

In the Big Bang theory, space was created first, and mass energy that forms the material world was created there. Space is the mother of the universe, and it still ‘reigns’ in silence. The newly discovered ‘space position energy’ tells us that we are already enjoying the great benefits of the universe. We just can’t

‘calculate’ it. Our perception ‘considers what we don’t calculate as non-existent.’ However, there are many things around us that we can’t calculate. Needless to say, the universe is natural.

1. The master of the universe is space, and gravity is a tool of space

The perception of the world based on the theory of speciesism refers to the fundamental universe that is on a different level from the perception centered on the existing gravitational field. Usually, the moment matter is born in space, position energy is created, and position energy also exists on a huge scale. Since we can’t calculate this, we call it dark matter energy.

(+) Space of Gravity

‘Natural gravity theory’ clearly explains gravity that was shrouded in mystery. Large mass bodies in dense galactic space store the position energy they have acquired as potential energy in space and move. Position energy(+) in space is the original energy of the universe that has never been calculated before. All energy has the characteristics of this position energy. Through this, we can say that position energy(+) in space is the source of cosmic energy. Here, we see the reality of dark matter and dark energy. (-) Gravity Space

The universe operates based on mass. Therefore, all existences are structured to depend on the ‘central mass’ to which they belong. In other words, if you are human, you are the Earth, and if you are the Earth, you are the Sun. Since humans existed inside the Earth, they discovered the position energy of space late. All large and small masses have position energy (+) of space and have gravitational energy (-) as a counteraction to it.

The combined (+) and (-) gravity system is a space energy system that has everything from small microscopic masses to huge galaxies. Until now, we have only recognized the (-) gravity system, which is half of this entire system. The world of (+) gravity has been newly opened to us.

When time is defined, space removes the veil of time and approaches us in a distinct form. The definition of space is not very difficult because the quantum field theory of modern physics has studied it abundantly. Quantum theory and particle physics allow us to define space as follows.

Space is a closed energy field with elasticity as a huge fluid with very low density. This characteristic of space is also an absolutely favorable environment for energy conservation and minimum operation. The extremely low temperature and rare density of space allow for complete control of unnecessary interactions and complete efficiency in performing necessary interactions. The characteristics of matter and energy indicate that they are not mere substances, but prototypes of existence that self-organize by finding the most efficient path.

2. Dynamics based on spatial analysis and energy density

The essence of gravity is the cohesion movement of space according to changes

in mass energy density. The density of space is so low that some say it is empty space, but this is a human-centered idea. The critical density of the universe is estimated to be approximately $9\times10^{-27}kg/m^3$. This is only the average value of the universe, and the average density of the galaxy world is $3.8\times10^{-22}kg/m^3$, which is more than 42,200 times different from the average of the universe. This strongly suggests that the universe is a dynamic space. If we consider the cohesion movement of space according to changes in energy density as the essence of gravity, this approach leads to a fundamental understanding of gravity.

① Density-based Gravity equation

The gravity we have is created when the energy density of space and the energy density of the Earth, which is a mass, condense space to create (+) and (-) potential energy.

• Mass density of space

F_{space}: Elastic Position energy, $F_{space} = k_1 \cdot \rho_{space} \cdot V_{earth}$

• Mass density of the Earth

F_{earth}: 응축적 Gravity energy, $F_{earth} = k_2 \cdot \rho_{earth} \cdot V_{earth}$

· k_1, k_2 Proportional constant

· ρ_{space} Mass density of space

· ρ_{earth} Mass density of the Earth

· V_{earth} Volume of the Earth

Here, the gravitational equation can be defined as follows.

• $F = F_{space} + F_{earth}$

• $F = k_1 \cdot \rho_{space} \cdot V_{earth} + k_2 \cdot \rho_{earth} \cdot V_{earth}$

· $V_{earth} = \frac{4}{3}\pi R_{earth}^3$

· The proportional constant k_1, k_2 can be derived from the simultaneous equations.

· $k_1 = 26166.3862696307 / \rho_{space}$ *Note: Critical density $\rho_{space} \approx 9.47^{-27} kg/m^3$

· $k_2 = 5.06305602848855$

ρ_{space}cancels out in the equation.Accordingly, the gravitational acceleration and gravitational constant can be obtained from the density-based equation.

• Gravitational acceleration

· Earth : $g_{earth} \approx 9.76 m/s^2$

· Jupiter : $g_{jupiter} \approx 24.77 m/s^2$

• Derivation of gravitational constant G

· Earth : $G = \frac{g_{earth} r^2}{m} = 6.644\times10^{-11}\ m^3 s^{-2} kg^{-1}$

· Jupiter : $G=\frac{g_{jupiter}r^2}{m}$=6.669×10^{-11} m^{3}s^{-2}kg^{-1}

· G = 6.67430×10^{-11} m^{3}s^{-2}kg^{-1}

Based on this, the density-based gravitational equation can be defined as follows.

$F=k_1\cdot\rho_{space}\cdot V+k_2\cdot\rho_{object}\cdot V$

As above, the validity of the density-based gravitational equation has been verified.

② Gravitational equation based on classical mechanics and relativity theory

The concept of space density is interpreted using classical mechanics and relativity theory as follows.

$H=\frac{1}{2}mv^2-\frac{Gm_1m_2}{r}(1-\frac{8\pi G\rho r^2}{c^2})$

· $1-\frac{8\pi G\rho r^2}{c^2}):\epsilon$ Space compressibility, ϵ increases the mass-energy density and generates gravity. ϵ shows that depends on the mass-energy density ρ and the distance r.

· At this time $F=\frac{Gm_1m_2}{r^2}$에서, $F=\frac{Gm_1m_2}{(r')^2}=\frac{Gm_1m_2}{(\epsilon r')^2}=\frac{Gm_1m_2}{(1-\frac{8\pi G\rho r^2}{c^2})^2r^2}$ can be expressed. The equation shows that the distance r between two masses is reduced by ‘space compression’. $r'=\epsilon r$, that is, r' represents the compressed distance after space compression. It shows that space compression and energy density increase are the reality of gravity. As space is compressed, the distance between two masses is reduced, and the increase in mass-energy density causes gravity. This can be expressed by Hamilton’s equation.

$H=\frac{1}{2}mv^2-\frac{Gm_1m_2}{r}(1-\frac{8\pi G\rho r^2}{c^2})$

From this Hamiltonian, we can derive the gravitational constant and gravitational acceleration. Here, using the average density and radius of Earth and Jupiter, we can calculate the gravitational constant and gravitational acceleration of each planet.

· Earth : $\frac{8\pi G\rho r^2}{c^2}\approx 1.151\times 10^{-10}$the gravitational constant G$\approx$6.674×10^{-11} and the gravitational acceleration g$\approx$9.81 are obtained.

· Jupiter : $\frac{8\pi G\rho r^2}{c^2}\approx 1.372\times 10^{-9}$ the gravitational constant : G$\approx$6.674×10^{-11} and the gravitational acceleration: g$\approx$24.79 can be obtained.

The compressibility of space $\epsilon = 1 - \frac{8\pi G\rho r^2}{c^2}$ in the theory of relativity shows that the nature of gravity is due to the change in the density of mass energy that space has.

3. Gravity equation based on space position energy

This describes the integrated gravity system based on the newly proposed position energy(+). It is an equation that synthesizes the gravity system by inheriting classical mechanics and expanding the space position energy α term and density $\rho(r)$term.

$U_H = \frac{1}{2}mv^2 - \frac{GMm}{r} + \alpha\frac{GM_Tm}{R} + \rho(r)$,

. $\frac{1}{2}mv^2$: Classical kinetic term. m is the mass of the object, v is the velocity.

. $-\frac{GMm}{r}$Gravity energy term, $G$is the gravitational constant, M is the mass of the central mass, m is the mass of the object, r is the distance between the masses.

. $\alpha\frac{GM_Tm}{R}$Space Position energy term, which can be calculated by synthesizing the amount of dark matter and dark energy in the space. $M_T$is the universe's ordinary matter, m is an individual mass, and R is the universe's radius.

· $\alpha \approx 1$ is a self-adjustment coefficient of Position energy reflecting the dynamic characteristics of the space

· $\rho(r)$ density term is connected to a multidimensional energy field and contains the core concept of this equation.

It expresses that it can be connected to the celestial space of galactic motion requiring precise mass density analysis, the identification and calculation of dark matter, the alternative analysis of the space curvature of the theory of relativity, fluid dynamics, and the energy field analysis of quantum mechanics. Here, space, density, and energy field are the same category.

Ultimately, the integrated and essential protagonist of the universe is space. This will be published simultaneously as a separate paper under the name of ‘Natural Intermediate Theory’.

3.1 Natural Gravitation and Space Dynamics Equilibrium

Individual masses are born in space and obtain two types of energy, (+) and (-). The ‘Position energy’ supported by space and the ‘Gravity energy’ that stabilizes the movement of the masses and allows them to operate accurately by being incorporated into the gravitational field. These two show the vitality and self-control of individual masses. Self-gravity energy gives inertia to the masses and helps them to move stably and precisely in space.

$$U_H = \frac{1}{2}mv^2 - \frac{GMm}{r} + \alpha\frac{GM_Tm}{R} + \rho(r)$$

Ordinary matter M_T, individual matter *m*, cosmic radius *R*, distance between two matter *r*, gravitational constant *G*.

Through this, dark matter and dark energy can be calculated as follows.

Base data : NASA Earthdata, ESA Planck satellite

3.1. Natural Dynamics Equilibrium in Ordinary Matter

$System$	$U_{space} = \alpha\frac{GM_Tm}{R}$	$U_{gravity} = -\frac{GMm}{r}$	$U_{space} / U_{gravity}$
Earth	1.486×10^{41}J	−5.299×10^{33}J	2.804×10^{7}
Sun	4.951×10^{46}	−8.095×10^{41}	6.116×10^{4}
Galaxy	3.734×10^{58}	−1.19×10^{54}	3.138×10^{4}
Ordinary Matter	4.085×10^{69}	-4.085×10^{69}	1.0

$U_{space} = Dark_{matter\ engery}$:

Dark Matter Energy is the Energy that has not yet been calculated. But this can be calculated now as Space potential energy.

The ordinary matter M_T of the universe and the individual mass m show that they are in harmony with the dynamics and interactions of (+) and (-) energy throughout the space. Each individual mass m has a large or small mass, but regardless of its size, it is connected and interacts with the universe M_T. This content and meaning need to be newly illuminated. The individual mass *m* ranges from large celestial bodies such as galaxies to various living things with mass, including humans in the sun and Earth.

Natural Gravity and Cosmic Balance

This shows that our universe can operate harmoniously and permanently in physical balance without the need for any other dark energy or dark matter. The universe creates what it needs, but never creates what it doesn't need.

The theory of natural gravity allows for the following explanations.

1. Gravitational lensing is a phenomenon of light refraction due to the increase in the density of space around a celestial body.
2. The biggest cause of redshift can be interpreted as the result of the stretching of the wavelength of light due to the self-gravity of a large celestial body and the high density of space. Accelerated expansion can be interpreted as the unique redshift of large, old stars, which is a characteristic of distant stars.
3. It can also be said that there is sufficient scientific basis for the fact that the universe no longer seems to have any ontological reason to expand. The

nature of the universe does not do things without a clear reason according to the principle of conservation of energy and least action. It also does things for a clear reason.

4. The reason GPS satellites speed up in space is because of the low density of space.

5. The problem of Mercury's perihelion, which led to the theory of relativity, can also be explained by 'space position energy'. The Sun and Mercury adjust Mercury's orbital motion (to their proper needs) through space position energy(+). This is the real appearance of space position energy that we humans first witnessed.

3.2. Individual Mass energy dynamics Equilibrium

The natural principle is fair. It is mechanical and transparent. This strong natural principle flow guarantees the efficiency of nature. What is characteristic is that it does not spare consideration for individual masses. This also speaks of the grandeur and delicacy of the principle of conservation of energy and minimum action as Figure 2.

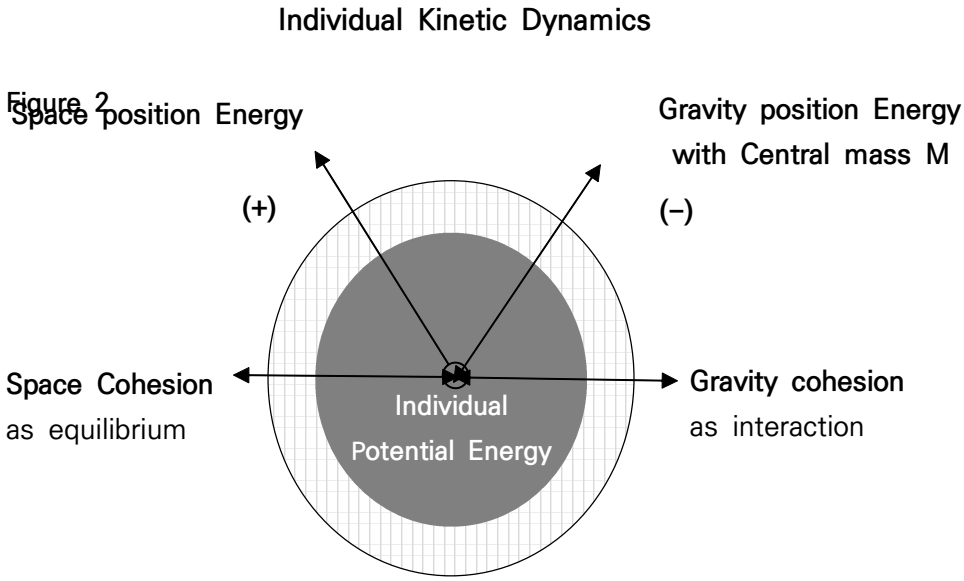


Figure 2

$$U_{space} = \frac{GMm}{R}$$

Space position energy of individual masses

Individual equilibrium

$\alpha \approx 1$

III. Ontology

The universe, the mother of the world, shows a consistent pattern toward 'unity'. Here, we will trace this ontologically. Space is integrated from the microscopic space of atoms to the macroscopic world of galaxies.

The radius of a hydrogen atom is approximately 53 picometers = 5.3 x 10^{-11}m, and the extremely small world surprisingly matches the scale (10^{-11}) of the gravitational constant G = 6.67430(15)×10^{-11} $m^3s^{-2}kg^{-1}$. This strongly suggests that the macro and micro are integrated into one space.

The concept of 'backward reasoning' is also possible in ontological inquiry. The condition of existence required for an unknown object is necessarily the same as its characteristics. Here, it is a scientific methodology to find the 'optimal solution' through multifaceted and multidimensional inquiry into the conditions of existence. This can stimulate related disciplines and promote interdisciplinary convergence activities.

The ontological scientific method completely overcomes the weaknesses of partiality, linearity, isolation, and closedness that science has as its fate. Fundamentally, it is the fact that we can approach the reality of existence through essentialist research based on causality. This overcomes the limitations of existing stubborn positivism.

This methodological revolution is also a demand of the times to actively accept research methods based on AI and big data. Under the constraint that the general principles of nature operate according to the law of conservation of energy and the principle of least action, this can be actively utilized with a scientific basis. This is because all causality in nature is discovered in the path where the principles of conservation of energy and least action operate.

This ontological understanding of the world makes our scientific efforts efficient, clear, and convenient. Socio-culturally, it allows everyone to correctly understand and utilize science and enjoy the abundant benefits of natural principles. This can be the core of the ontological scientific method.

In superfluid phenomena

Superfluid is a fascinating substance that is a fluid with no viscosity at all and has elasticity on the fluid surface. Therefore, it can move forever without friction. This shows part of the fundamental principle of the universe. This may suggest a hidden characteristic of space itself that encompasses the micro and macro worlds.

Superfluid is a state in which many bosons have the same quantum state. At this time, all particles can be condensed to the ground state. The superfluid state is a macroscopic quantum mechanical state such as laser and superconductivity. Representative superfluid forms can be seen in Helium-3 and Helium-4. Their density is approximately 0.134 ~0.166 g/cm^3. This exists at a temperature similar

to or slightly lower than the average temperature of the universe, and has a density much higher than the average density of galaxies and lower than the average density of the solar system. This may be a general phenomenon at the level of interstellar molecular clouds.

In other words, it is an assumption that the basic base of space itself may be superfluid. The basic basis of space is the assumption that space is composed of a single particle like a crystal, and that the rest can be ordinary matter. It is an assumption that the super-low temperature space of -270.45 ~ -272℃ has superfluid characteristics and operates according to the principle of energy conservation and minimum action, and that it pursues the highest efficiency based on this.

The One, the Ontological Hypothesis of Space

The primordial energy at the time of the Big Bang may have originally been The One, the ultimate being. This is the primordial energy at the time of the Big Bang, and the evolution of the universe since then can be seen as the process of The One being differentiated into various forms. Some of the primordial energy that was The One was quantized and became particles to form the material world. The rest is in a more primitive state, forming space and helping the movement of the mass particles that it created, which is also possible to infer that the current space is the result. This is close to the result that appears in the flow of pattern analysis that traces the characteristics of space. Through this pattern analysis, the following characteristics of space can be assumed and synthesized.

1. Connectivity: Space is not simply empty space, but is connected to each other through various forces such as gravity and electromagnetic force. For example, galaxies are attracted to each other by gravity, and stars rotate around the center of galaxies. This connectivity shows that the entire space operates as a single system.

2. Dynamics: Space is not a static space, but is constantly changing. The universe is expanding, and stars are born and die. These dynamic changes mean that space is a dynamic system that evolves over time.

3. Wholeness: Space is a holistic system in which parts and wholes are connected to each other. Individual stars or galaxies are part of the universe and reflect the characteristics of the entire universe.

Considering these characteristics of space comprehensively, we can consider the possibility that space itself exists as a single integrated whole, that is, The One.

4. Logical flow of patterns: This is more like a logical flow of patterns than an intended scenario. The method of tracing phenomena and their patterns, inferring them, and verifying them in various ways with big data can be a powerful methodological framework. In particular, it can show the efficient performance of pattern analysis of multidimensional energy fields tracked by

'natural dynamics'.

The concept of 'The one' is a conclusion that can be derived through analysis of phenomena and patterns, and it is considered to have the potential of a powerful cosmology. In particular, it presents even more interesting possibilities when connected to the concept of 'natural dynamics'. As the ultimate prototype of multidimensional energy fields, 'The one' can become a core concept for space. Even if it is not a complete superfluid, it is very useful just by obtaining the highest efficiency that space has.

Meanwhile, The one can also be seen as a concept that has a physical meaning similar to Taegeuk and Gi in East Asian natural philosophy. The one is the origin and creation principle of all things in the universe, and is an integrated whole that encompasses all existence. This has many similarities with the characteristics of space discovered so far.

In addition, the concept of The one can be given new meaning through its connection with modern science, especially quantum mechanics. It is considered that concepts of modern science such as quantum fluctuation, quantum entanglement, and quantum superposition can be connected to the concept of The one and suggest a new interpretation of the universe. The universe fairly treats everything that possesses mass energy, from natural particles and atoms to countless lives including humans and even giant galaxies, as ‘existence.’ However, the existence of existence is ‘space.’ This tells us that the integral and essential protagonist of the vast universe is space.

Bibliography

Books :
1.“The Ontology of Spacetime” by Vesselin Petkov (2014)
2.“Newtonian Cosmology" by David Wands (2017)
3.“The Trouble with Physics : The Rise of String Theory, the Fall of a Science, and What Comes Next” by Lee Smolin (2006)
4.“The Quantum World” by Ford, Kenneth W(2005)
5.“Meta Humanities 1.0”, Jason Ryoo, Author of this paper, InnoLab 2022

Research Articles:
1.“Is Einstein's Greatest Work All Wrong?" by David Merritt (2020)
2.“The Problem of Time in Quantum Gravity" by Claus Kiefer (2009)
3.“Computer database structural interpretation of Kant's epistemology”, by Jason Ryoo, Author of this paper (2013)

Online Resources:
1. NASA, Wilkinson Microwave Anisotropy Probe
https://map.gsfc.nasa.gov/
The full nine-year analysis of the time-ordered data.
2. ESA, Planck Legacy Archive
https://www.cosmos.esa.int/web/planck/publications
GAIA Mission, XMM-NEWTON Mission, Herschel Mission
3. Apache Point Observatory (APO)
https://www.sdss.org/
Publications, Education and Public Outreach

Title: Natural Gravity Theory Based on Ontology
- Space Dynamics

Authors: Jason Kuhyun Ryoo

Affiliations: Individual researcher, his private research institute Innolab.
Jason Kuhyun Ryoo *Innolab, 114-1303, 4-9, Jang sung Baegi_ro, DongJak_gu, Seoul, 06966, Korea

*Corresponding author Jason Kuhyun RyooEmail: visionreale@gmail.com

Abstract

1. Discovery of Perfect Gravity

According to the Big Bang theory and quantum field theory, space can be considered the mother of the universe. Matter can also be seen as a densely compressed space. The universe creates mass in the space it creates, and mass has positional energy(+) in space. As a result, space can produce positional energy with ordinary matter and become the power source of the universe. We study space, which is less well-known than matter, to reveal the basic principles of the universe and the physical world. The main methodology here is the ontological scientific method based on the world perception of quantum theory and classical mechanics.

2. Discovery of Dark Matter Energy

Until now, we have only known the gravitational energy(-) discovered by Newton 360 years ago as gravity. We can find new positional energy(+) created by ordinary matter in space and calculate it using Newtonian mechanics. Until now, we have called this existence dark matter and dark energy. Now, we can integrate the gravity of (+) and (-) and call it 'natural gravity'. This ‘discovery’ will present us with a larger and richer whole world beyond the partial perception of science and the gravitational worldview of existing civilizations.

I. Introduction

This study takes a methodology that directly approaches the research topic based on ontology and essentialism. This reduces formal relational techniques and focuses on directly understanding the essence of existence. As a researcher, I call this ‘the Ontological scientific methodology.’

This is to increase the performance and efficiency of research by introducing the multidimensional pattern analysis of artificial intelligence and the verification principle based on big data.

1. Discovery of Space

According to the Big Bang theory and quantum field theory, space can be considered the mother of the universe. Matter can also be seen as a densely compressed space. The universe creates mass in the space it created, and mass has positional energy (+) in space. Accordingly, space secures Position energy on its own and becomes the power source of the universe. Mass exerts elastic pressure on space with Position energy (+), and space condenses itself to create Gravity energy (-) of the same size and returns it to the mass. At this time, the elastic (+) energy and condensation (-) energy created by space cohesively. This is the entire gravitational field.

Until now, we only knew the condensation (-) energy discovered by Newton 360 years ago as gravity. We have newly discovered (+) gravity in the Position energy of space throughout the universe and established a total natural gravity system. We can call this ‘natural gravity.’

Quantum Theory Space

Recently, quantum mechanics has revolutionized human civilization into a quantum theory world. In quantum theory, there is already an electric field theory that is on par with the theory of gravity. It is the process in which atoms generate ‘electric charge’ in space and form an electric field. Atoms have protons, electrons, and neutrons. Protons have a (+) charge, and electrons have a (-) charge. When they are balanced inside an atom and gain energy from the outside, the (+) charge and (-) charge come out into space. The charge that appears in space gains 'Position energy' from space. Based on this, the charge creates an electric field and then a magnetic field. At this time, the potential energy (+) of the charge is proportional to the product of the charge amount and inversely proportional to the square of the distance according to Coulomb's law. $F = k\frac{q_1 q_2}{r^2}$, K : Coulomb's constant. This closely resembles the gravitational equation $F = -G\frac{m_1 m_2}{r^2}$ we are familiar with. , G : Gravitational constant. Here, space drives the interaction of energy storage, exchange, and

transformation, and helps the movement of mass energy with perfect efficiency. Since space originally originated from energy, it can easily perform the function of energy exchange and transformation without a separate medium.

Like equations, the macro and micro worlds are very similar. However, the polarity of (+) (-) in the micro world does not exist in the macro world, and only (-) gravitation nergy exists. Is (+) gravitation nergy not there originally? One of the weaknesses of our perception is that we think that what is not calculated does not exist.

2. Discovery of new energy source (+) gravity

Power is inevitably composed of (+) and (-). The universe may already be using (+) power well, but we may not know it and cannot calculate it. Gravity is the fundamental power that moves the universe, and power is an energy conversion system. All energy has the property of Position energy.

Since high energy density has Position energy for low energy density, the difference in density in space creates gravity.

Space can obtain continuous power by changing the density of its energy. Space produces potential energy through space condensation cohesion by changing energy density. At this time, mass bodies with high energy density can be actively utilized. In particular, the Position energy (+) of large celestial bodies can become the fundamental power of the universe. Through this, we can establish an ‘energy density-based gravitational equation.

1)Energy density-based gravitational equation

The gravity we have is created by the energy density of space and the energy density of the Earth, which is a mass body, condensing space to create (+) and (-) potential energy.

○ Mass density of space

F_{space}: Elastic Position energy, $F_{space} = k_1 \cdot \rho_{space} \cdot V_{earth}$

○ Earth's Mass Density

F_{earth}: Condensed gravitation energy, $F_{earth} = k_2 \cdot \rho_{earth} \cdot V_{earth}$

· k_1, k_2Proportional constant

· ρ_{space} Mass density of space

· ρ_{earth} Mass density of Earth

· V_{earth}Volume of Earth

Here, the gravitational equation can be defined as follows:

○ $F = F_{space} + F_{earth}$

○ $F = k_1 \cdot \rho_{space} \cdot V_{earth} + k_2 \cdot \rho_{earth} \cdot V_{earth}$

○ $V_{earth} = \frac{4}{3}\pi R_{earth}^3$

· The proportional constant k_1, k_2can be derived from the simultaneous equations.

· $k_1 = 26166.3862696307/\rho_{space}$ *Note: Critical density $\rho_{space} \approx 9.47^{-27} kg/m^3$

· $k_2 = 5.06305602848855$

ρ_{space} in are mutually eliminated in the equation.

Accordingly, the gravitational acceleration and gravitational constant can be derived from the density-based equations.

○ Gravitational Constant

· Earth : $g_{earth} \approx 9.76 m/s^2$

· Jupiter : $g_{jupiter} \approx 24.77 m/s^2$

○ Derivation of the gravitational constant G

$G = \frac{g_{earth} r^2}{m}$

· Earth :=6.644×10^{-11}m^{3}s^{-2}kg^{-1}

· Jupiter : $G = \frac{g_{jupiter} r^2}{m}$

· G= 6.67430×10^{-11}m^{3}s^{-2}kg^{-1}

Based on this, the density-based gravitational equation can be defined as follows.

$F = k_1 \cdot \rho_{space} \cdot V + k_2 \cdot \rho_{object} \cdot V$

As above, the validity of the Energy density-based equation was verified.

2)Gravity equation based on Classical mechanics and Relativity theory

Energy density-based gravitational equation

The concept of spatial density derived from Lagrangian and Hamiltonian can be interpreted using classical mechanics and relativity as follows.

$H = \frac{1}{2}mv^2 - \frac{Gm_1m_2}{r}(1 - \frac{8\pi G\rho r^2}{c^2})$

The gravitational constant and gravitational acceleration can be obtained by Spatial Compression Ratiothat can be viewed as mass density ϵ.

$\epsilon = 1 - \frac{8\pi G\rho r^2}{c^2}$

depends on the mass-energy density ρ and the distance r

$F = \frac{Gm_1m_2}{r^2}$

At this time, can be expressed as

$$F=\frac{Gm_1m_2}{(\acute{r})^2}=\frac{Gm_1m_2}{(\epsilon\acute{r})^2}=\frac{Gm_1m_2}{(1-\frac{8\pi G\rho r^2}{c^2})^2r^2}$$

The equation shows that the distance $r$between the two masses is reduced by $\acute{r}=\epsilon\acute{r}$ 'space compression'. , that is, represents the compressed distance after space compression. It shows that space compression and energy density increase are the realities of gravity. Here, based on the Earth and space compression rate ϵ, the gravitational acceleration of Jupiter and the value of the gravitational constant Gcan also be confirmed.

· Earth: gravitational acceleration g≈9.81, gravitational constant G≈6.674×10^{-11}

· Jupiter: gravitational acceleration g≈24.79, gravitational constant: G≈ 6.674×10^{-11}areobtained.

The change in the compressibility of space in the theory of relativity can also be interpreted as a change in the mass energy density of space, which is the essence of gravity. We can confirm that the concept of 'essential gravity' can be established in various energy fields and the already established dynamics and gravitational equations. * Note 1) p.15

II. Natural Gravitation Theory

Natural gravity theory tells us about a world that is different from the existing gravity-centered worldview. It goes beyond the partial world understanding formed based on the gravitational world and shows a holistic world. This clearly explains the reality of gravity that has been shrouded in mystery until now.Since the universe system operates based on the mass of a mass body, a 'being' with mass is structured to depend primarily on the central mass body to which it belongs. Since humans existed on Earth, their cognitive patterns were composed of gravitational patterns. They perceived the limited gravitational space as the entire universe. The gravitational scale accepted only the measured world as reality. This is the 'partiality' of our science.

Meanwhile, everything precious that is not conceptualized or calculated was easily alienated and evaluated as worthless by arbitrary scales. What was not evaluated or calculated was recognized as non-existent. Humans and science had to be more logical, more meticulous, and more perfectly proven in order to adapt to the dynamical relationships of the limited gravitational world. This may be the reality of positivism that we deeply rely on.

1. Universal Dynamics System, Natural Gravity Theory

Space can create a natural dynamical system that interacts with mass energy to create energy density differences and then rebalances them through consistent

cycles. We note that space is the only entity that can do this, encompassing the micro and macro worlds of the universe. Space is in a position to fully implement this based on the natural law of conservation of energy and the principle of least action throughout the universe.

Natural gravitation is based on the philosophy of science based on quantum ontology. According to quantum theory, the ontology of the universe regards physical substance as energy. Existence must have a physical basis, and at the same time, it moves according to the principle of least action according to the law of conservation of energy.

The standard of this ontology distinguishes essence from phenomenon, and becomes a measure for distinguishing existence and relationship. This ontological world does not regard things without energy as existence. Therefore, it regards time as non-entity. The world of natural gravitation is a three-dimensional space and the movement of mass energy within it.

The main result of this ontological exploration is the discovery of ‘space Position energy’. This is ‘ordinary matter Position energy’ that clearly exists in space but has not yet been calculated. Its physical characteristics and scale are equivalent to those of dark matter and dark energy.

Natural gravity theory adopts the quantum world view and the principles of classical mechanics to clarify the existence, characteristics, and quantitative scale of position energy in space, thereby suggesting a natural principled balance of the universe that does not require dark matter and dark energy separately.

2. Composition of space Position energy and gravitation energy

Natural Gravity Theory harmoniously explains the overall universe system through the Lagrange-Hamilton dynamic equations and proves it through calculations. Natural dynamics Universal Dynamics (hereinafter referred to as Udynamics) synthesizes these and establishes them as a balanced Natural Gravity Theory.

Since it is a gravity theory centered on space, it can also be called a ‘space gravity theory’. This can be expressed as the Universal Hamiltonian: UH equation as follows. The UH equation is a new concept of dynamic equation that captures multidimensional space such as relativistic dynamics, fluid dynamics, and quantum theory’s spatial dynamics as ‘energy density’ by accepting the space Position energy, which is (+) gravity, and the density function $\rho(r)$. Here, it says that ‘energy density’ is the essence of gravity. High energy density space acts as Position energy in low energy density space.

$$U_H = \frac{1}{2}mv^2 - \frac{GMm}{r} + \alpha\frac{GM_T m}{R} + \rho(r)$$

. $\frac{1}{2}mv^2$ The kinetic energy of an object. $m$is the mass of the object, and $v$is

the velocity.

. $-\frac{GMm}{r}$ gravity energy term. $G$is the gravitational constant, $M$is the mass of the central mass, $m$is the mass of the object and $r$is the distance between the masses.

. $\alpha\frac{GM_Tm}{R}$ as space Position energy, this is calculated by integrating the amount of dark matter and dark energy in that space. M_T represents the natural ratio between Position energy and gravitation energy.is the ordinary matter of the universe, m is the individual mass, and $R$is the radius of the universe.

. $\rho(r)$ the mass-energy density is a multidimensional energy field, and variables are interpreted and interact with energy density distributions. This expresses that it can be connected to the celestial space of galactic motions requiring precise mass density analysis, the identification and calculation of dark matter, the alternative analysis of space curvature in the theory of relativity, fluid dynamics, and energy field analysis in quantum mechanics. That is, mass-energy and its density distribution are tracked and calculated in various fields centered on space.

· The gravitational constant $G$is used here as well. In the calculation of (+) gravity, it is calculated
as a positive value. That is,

$F_\alpha = -G\frac{m_1m_2}{r^2}$, G=6.67430×$10^{-11}$$m^3s^{-2}kg^{-1}$ can be defined.

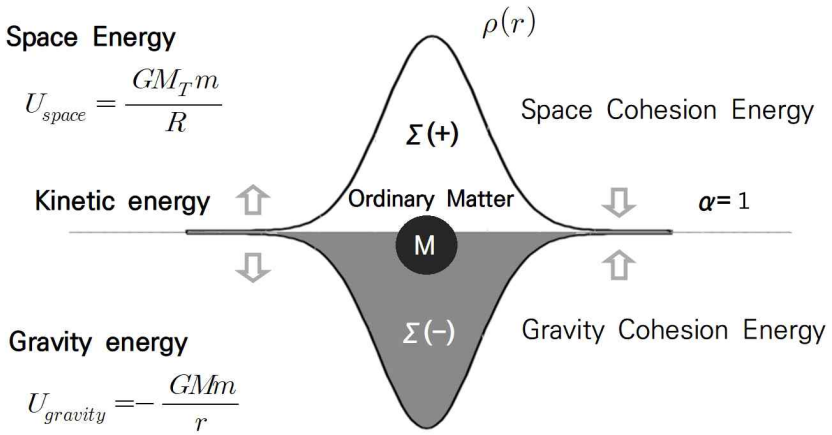
3. Space Equilibrium Dynamics with Mass Energy Fields

The fundamental material world of the universe is in classical mechanical balance shown as below, with Space position energy (+) and existing Gravity energy (-) interacting.

As shown in the figure 1, the universe is usually balanced by Space Position energy and Gravity energy in the ordinary material dimension. It is shown that the following relationship holds in Natural Gravity Theory when the mass M_T is the ordinary matter, an individual mass$m$, the radius of the universe R, and the distance $R(r)$ between two masses.

$$U_{space} = \frac{GMm}{r}, \quad U_{gravity} = -\frac{GMm}{r}$$

Figure 1. Space Equilibrium With Mass Energy Fields



In the ordinary material dimension of the entire universe, $m=M$, $r=R$, so

$$U_{space} + U_{gravity} = \frac{GM_T^2}{R} - \frac{GM_T^2}{R} = 0$$

, this becomes achieved balance.

Here, α=1, an adjustment coefficient of Position energy reflecting the dynamic characteristics of the space.

In this relation, the central mass can be ordinary material , a galaxy, the sun, the earth, etc., and the individual mass *m*can also be a galaxy, the sun, the earth, and an individual mass within the earth.

The individual mass has a mechanically fair structure in which potential energy is distributed from the entire system in proportion to its mass. The universe gives potential energy to an individual mass *m* exactly as much as its mass. This is in accordance with the conservation of energy and the principle of least action in nature. It can be seen that Newtonian mechanics reflects this well. As a result, the dynamical composition of the universe system can be explained as a whole.

4. General equilibrium of the Universal system and the real interpretation of dark matter and dark energy

The UH equations provide a quantitative analysis of how each space system moves through space Position energy U_{space}, kinetic energy $E_{kinetic}$, and gravity nergy $U_{gravity}$. The first task is to clarify the reality of dark matter and dark energy. In other words, the newly discovered (+) gravity of ordinary matter, the 'space Position energy', is 'dark matter and dark energy'. This is a newly discovered energy source of the universe that has not been captured and measured in existing physics. However, we find out that this is natural energy that we can see in our daily lives in the world and that we already use a lot of. We just haven't calculated it.

Space Position energy is the unique Space potential energy that unit mass energy has in space, from large celestial bodies to general mass bodies and minute unit particles, as ‘real dark matter and energy’. Therefore, the sum of this is the Position energy of ordinary matter, and the value converted to mass can be the dark matter we have imagined. Since galaxies naturally have this on a large scale, they can perform stable rotational motion.

1. Based on the above discussion, the natural gravitational theory can quantify the size of the individual ‘space position energy’ of the space system using the UH equation and the basic data below.

· Based on NASA Earth data and ESA Planck satellite data

M_T: Mass of the entire universe ordinary matter 1.641×10^{53} kg

R: Radius of the universe 4.4×10^{26}m

G: Gravitational constant $6.674\times10^{-11}m^{-3}\cdot kg^{-1}\cdot s^{-2}$

M: Central mass (Central mass of an orbit such as the Sun of a galaxy)

m: Individual mass (Individual mass belonging to an orbit)

$$U_H = \frac{1}{2}mv^2 - \frac{GMm}{r} + \alpha\frac{GM_Tm}{R} + \rho(r)$$

$$U_H = E_{kinetic} - U_{gravity} + U_{space}$$

Earth-Sun System :

M : Mass of the Sun $=1.989\times10^{30}$ kg

m : Mass of the Earth $=5.972\times10^{24}$kg

v : Orbital velocity of the Earth $\approx$29.78 km/s

r : Average distance between the Sun and the Earth $\approx1.496\times10^{11}$ m

Space Position energy: 1.486×10^{41}J(1.653×10^{24}kg)

Earth Gravity energy: -5.299×10^{33}J

Kinetic energy: 2.648×10^{33} J

α= 1.0 :

1. In the Earth-Sun system, Space position energy(+) forms the axis of the entire system. This is a scale that far exceeds Gravity energy. Our physics has not yet captured this as position energy(+). All of these can be viewed as position energy(+) with a scalar value different from gravity energy(-). Most of these are understood to be used as system utility energy that operates the space system. Position energy is also directly used to form the ecosystem. It is an abundant and diverse ecological resource such as solar energy, water, and air. And there are abundant and diverse ecological and living resources, such as solar energy, water, and air.

2. Meanwhile, gravity energy is converted into various kinetic energies and used for the movement of the Earth. About half of this is used for orbital movement ($2.648\times10^{33}\approx1/2\times5.299\times10^{33}$). According to Kepler's second theorem and the law of conservation of energy, orbital kinetic energy is $K=-\frac{1}{2}U_{gravity}$,

and all orbiting planets convert about half of their gravity energy (-) into orbital kinetic energy (+). Gravity energy plays a fundamental role in the movement of the planet, including its rotation and tidal movements. It also includes the circulating energy of water and air, and various energies beneath the earth's crust. However, it is relatively small compared to the potential energy of space. This is the actual form of gravity energy that we know.

3. Kinetic energy is the main player in the movement of celestial bodies, converting gravity energy and space potential energy. However, its scale is usually less than half of gravity energy.

Sun-Galaxy System:

MG: Mass of our galaxy 1.5×10^{42}kg

r : Distance between the Sun and the center of the galaxy 2.6×10^{20}m

Space Position energy : 4.951×10^{46} J(5.509×10^{29}kg)

Gravity energy: -8.095×10^{41} J

Kinetic energy: 4.813×10^{40} J

α= 1.0

1. Here again, Space potential energy is the center of the entire system. That is, it shows that the absolute part of the energy of space supports mass and its motion. Here again, Gravitational energy is more than twice as far ahead of the kinetic energy, stably supporting the motion of the planets and stars in the solar system.

Galaxy- Ordinary Matter System:

Space Position energy: 3.734×10^{58} J(4.155×10^{41}kg)

Gravity energy: -1.19×10^{54} J

Kinetic energy: 6.640×10^{53} J

α= 1.0

1.Based on observational and computational data, the rotational speed of the galaxy is calculated to be 220 km/s and the orbital speed is 630 km/s. The rotational kinetic energy is estimated to be 7.22×10^{52} and the orbital kinetic energy is estimated to be 5.92×10^{53} J, resulting in a basic kinetic energy requirement of 6.64×10^{53} J. However, considering the size of the galaxy and the structural speciality of its internal motion, the current gravitational energies may not be enough to cover the kinetic energy. That is, the Gravity energy size is 16% smaller than the basic requirement of kinetic energy according to Kepler's theorem.

2.The above data shows that $6.640\times10^{53}/(1/2\times1.19\times10^{54})\approx1.16$ is less than the minimum Gravity energy. Nevertheless, the rotational speed of the galaxy is stable, and the outer velocity is faster than expected. Based on this, the existence of dark matter has been predicted for a long time. However, the newly discovered (+) gravity more than covers the space Position energy of 3.734×10^{58}

J.

Ordinary Matter System:

M_T : Mass of the entire universe's ordinary matter 1.641×10^{53} kg

R: Radius of the universe 4.4×10^{26}m

Space Position energy: 4.085×10^{69}J(4.545×10^{52}kg)

Gravity energy : -4.085×10^{69}J

Kinetic energy : 8.205×10^{62}J

Difference (1)−(2+3) : 8.170×10^{69}J

α=1

It shows that ordinary matter is the center of the universe system. In the entire ordinary matter system, the Position energy of the universe: 4.085×10^{69}J and the Gravity energy: -4.085×10^{69}J are equal, and finally the ultimate universe balance of α=1 is achieved.

Base data : NASA Earthdata, ESA Planck satellite

4.1 Natural Dynamics Equilibrium in Ordinary Matter

$System$	$U_{space}=\alpha\frac{GM_Tm}{R}$	$U_{gravity}=-\frac{GMm}{r}$	$U_{position}/U_{gravity}$
Earth	1.486×10^{41}J	-5.299×10^{33}J	2.804×10^{7}
Sun	4.951×10^{46}	-8.095×10^{41}	6.116×10^{4}
Galaxy	3.734×10^{58}	-1.19×10^{54}	3.138×10^{4}
Ordinary Matter	**4.085×10^{69}**	**-4.085×10^{69}**	**1.0**

$$U_{space}=U_{Dark\ matter\ engery}$$

Dark Matter Energy is the Energy that has not yet been calculated. But this can be calculated now as Space potential energy.

Universe Balance

This shows that our universe can operate harmoniously and permanently in physical balance without the need for any dark energy or dark matter. The universe creates what it needs, but never creates what it doesn't need.

III. Conclusion

(+) The discovery of gravity shows that physics and our perception have long been tied to Newton's gravitational worldview. The 'Natural Gravity Theory' that accepts the newly discovered 'space Position energy' brings fundamental balance to cosmology. As a result, Natural Gravity Theory and holistic natural dynamics have opened a new path to solving various physical problems such as dark matter and dark energy that have been challenges so far. Natural Gravity Theory

enables the following explanations.

1. The gravitational lensing phenomenon is a phenomenon of light refraction due to the increase in space density around a celestial body.

2. The biggest cause of redshift can be interpreted as the result of the self-gravity of a large celestial body and the stretching of the wavelength of light due to high space density. Accelerated expansion can be interpreted as the unique redshift of large, old stars, which is a characteristic of distant stars.

3. It can be said that there is sufficient scientific basis for the fact that the universe no longer seems to have any ontological reason to expand. The nature of the universe does not do things without a clear reason according to the principle of energy conservation and minimum action. It also does things for a clear reason. 4. The reason why GPS satellites are faster in space is because of the low density of space.

5. The problem of Mercury's perihelion, which led to the theory of relativity, can also be explained by 'space Position energy'. The Sun and Mercury adjust Mercury's orbital motion (to their appropriate needs) through space Position energy (+). This is the first real appearance of space Position energy that we humans have witnessed. However, Mercury shows two more things. It exceeds the orbital kinetic energy consumption (1/2 of Gravity energy) by 4.3% compared to the general planets. It also has an elliptical orbit with an eccentricity of over 20.1 degrees. These consistently show that there is another force in space besides gravity.

6. Since the gravitational system is well-defined and stable, the concept of gravitons, which is a quantum-theoretical endeavor, is unnecessary.

This study shows that the universe is an efficient system that is in balance with simpler and clearer principles than we think. Nature follows the principles of energy conservation and least action. This can be seen as a unique characteristic that it has because it originated from energy.

7. ‘Space Position Energy’ is already being used to a great extent, but I believe that there may be new energy sources that can be explored and discovered in the future.

This understanding of gravity may also lead to a rethinking of the concept of the 'graviton‘, one of the quantum theoretical efforts. It may also help to provide new analytical methods for existing cosmologies, such as the ΛCDM Model of Cosmology.

The complex movement methods that we can imagine may contradict the principles of nature. Nature shows us that the world is as we intuitively see it. This is because human intuition deeply shares and senses the fundamental basis of the physical principles of nature. Natural Gravity Theory sees space itself as the matrix and mother of the universe. Therefore, it is expected that the entire physical world can be interpreted and integrated as a quantum theoretical space. The ‘existential scientific method’ has led to an integrated understanding of the

world. We have been able to see the world again in its original three-dimensional form according to our intuition.

Note 1) Key concepts by type of gravity theory

Newtonian mass gravity theory

$F = G\frac{m_1 m_2}{r^2}$ G: gravitational constant (G=6.67430(15)×10^{-11} $m^3 \cdot s^{-2} \cdot kg^{-1}$)

Gravity is the force that masses pull each other. This is due to the law of universal gravitation.

This classical gravity theory still boasts strong efficiency in the world of the Earth dimension. However, it only looks at the world of self-gravity and calculates it.

Einstein's geometric gravity theory

$$R_{\mu\nu} = \frac{1}{2} g_{\mu\nu} R + g_{\mu\nu} \Lambda = \frac{8\pi G}{C^4} T_{\mu\nu}$$

Gravity is the interaction between mass energy and space. This is because mass energy deforms space.

Einstein's understanding of the geometric world was sophisticated. However, Einstein's general theory of relativity did not go beyond the spatial geometric model of Newtonian mechanics.

Natural Gravity Theory

$$U_H = \frac{1}{2} m v^2 - \frac{GMm}{r} + \alpha \frac{GM_T m}{R} + \rho(r)$$

Gravity is the cosmic dynamic activity of space utilizing the difference in the density of mass energy.

$U_H = E_{kinetic} - U_{gravity} + U_{position}$, $U_{position} = U_{Dark\ matter\ energy}$

Space generates mass energy to create a difference in density, and based on this, it creates Position energy(+) and gravitation energy(-), which becomes the cosmic dynamic itself. Therefore, the master of gravity is space.

The UH equation inherits the classical physics system and is a 'classical physics' form including the space Position energy $\alpha \frac{GM_T m}{R}$ and the quantum theory-based multidimensional energy density function $\rho(r)$. Here, the α coefficient shows the ratio of the space Position energy and its own gravity nergy.

Here, the gravitational constant G can be used as it is. , G=6.67430(15)×10^{-11} $m^3 \cdot s^{-2} \cdot kg^{-1}$. In the calculation of the elastic space Position energy (dark energy), which is (+) gravity, it can be calculated as a positive value. This can be understood as an elastic repulsive force that pushes and does not attract each other as a condensation force. The essentialist clarification of the gravitational constant G will be published together in a separate paper.

Bibliography

Books :

1."The Order of Time" by Carlo Rovelli (2018)

2. Newtonian Cosmology" by David Wands (2017)

3.“The Theoretical Minimum” by Leonard Susskind (2014)

4."Quantum Gravity" Cambridge university, by Carlo Rovelli (2004)

5.“Classical Mechanics” by Thomas Walter Bannerman Kibble, Frank Berkshire (1966)

6.”Meta Humanities 1.0”, Jason Ryoo, Author of this paper, InnoLab 2022

7.“Foundations of Large Language Models”, Isaiah Onando Mulang, 2023

Research Articles:

1.“Is Einstein's Greatest Work All Wrong?" by David Merritt (2020)

2."The Unreality of Time" by John McTaggart Ellis McTaggart (2009)

3.“The Measurement of the Newtonian Gravitational Constant G" by Terry Quinn (2014)

4.Jason Ryoo, Author of this paper, InnoLab 2013

Online Resources:

1. NASA, Wilkinson Microwave Anisotropy Probe
https://map.gsfc.nasa.gov/
The full nine-year analysis of the time-ordered data.

2. ESA, Planck Legacy Archive
https://www.cosmos.esa.int/web/planck/publications
GAIA Mission, XMM-NEWTON Mission, Herschel Mission

3. Apache Point Observatory (APO)
https://www.sdss.org/
Publications, Education and Public Outreach

Title:Study of the Gravitational constant G based on Spatial dynamics

Authors: Jason Kuhyun Ryoo

Affiliations: Individual researcher, his private research institute Innolab.
Jason Kuhyun Ryoo *
Innolab, 114-1303, 4-9, Jang sung Baegi_ro, DongJak_gu, Seoul, 06966, Korea
*Corresponding author Jason Kuhyun RyooEmail: visionreale@gmail.com

November 1, 2024

Seoul, Korea
InnoLab Natural Science Research Institute
visionreale@gmail.com
jasonryoo@naver.com
http://udynamics.net/

Abstract

The constants of physics are at the center of new discoveries. This is because they are empirical measurements that most closely explore reality. ‘Space-centered dynamics research’ illuminated the essence of the gravitational constant G. The unique ‘relationship’ and ‘spatial scale’ of the composition of the gravitational constant express its own essence. In addition, the ‘reverse structure for general density’ of the gravitational constant well expresses the principle of self-composition of nature, which was enough to stimulate curiosity. The gravitational constant strongly asserts that it is not a simple proportional equation, but one of the main characters of space.

It also actively implies that the master of the universe is ‘space’, not mass energy. In other words, space adjusts the gravitational constant G to adjust the movement of space, mass, and energy with ‘energy density’. Through the exploration of the universal constants of nature, we come closer to the essence of nature. Through the gravitational constant, we come to understand the essence of gravity more deeply.

I. Introduction:

Approaching the nature of gravity

The study of space-centered dynamics sheds light on the nature of the gravitational constant G. Universal constants show what kind of goal the universe has designed nature for. The gravitational constant G is a relational constant of physical elements structured with the goal of forming a certain gravity.

Here, we first discover the 'reverse structure of density' of the gravitational constant. We note that the universe sets a certain gravity target and aims to invest the minimum mass and energy. We confirm that the universe strategically uses the law of conservation of energy and the principle of least action for this purpose.

Gravity is formed by space and mass-energy, but space shows the principle of self-organization through the gravitational constant. The composition of the gravitational constant consists of a unique 'relation' and a 'spatial scale'. This shows that the gravitational constant is not a simple gravitational construct, but a result of the grand plan of the universe system.

II. Structure of Gravitational constant

1. Composition and Dimensions of Units

The basic units of gravity in the International System of Units are as follows.

Gravitational Constant G SI : $m^3 \cdot kg^{-1} \cdot s^{-2}$

The SI characteristics of these unit elements are that they are composed of space (m^3), mass (kg^{-1}), and energy (s^{-2}). Gravitational constant itself reflects the essential composition of the universe. It sets up a structure of minimum input by placing both mass (kg^{-1}) and energy (s^{-2}) in the denominator. Based on this, it has a strategic position to organize and respond to the energy density in space (m^3).

Relationship and scale of the gravitational constant

The index consists of a relation and a scale. $6.6743\ m^3 \cdot kg^{-1} \cdot s^{-2} \times 10^{-11}$, It is 'the relationship × scale'.

· Relationship constant : $\frac{m^3}{kg \cdot s^2}$, This relation constant is a form of configuring energy density for space by generating energy (s^{-2}) based on mass (kg^{-1}). The relation shows how gravity is structured and generated.

· Gravity scale index : 10^{-11}

This indicates the spatial scale in which the physical elements that constitute

gravity can interact. This means that the radius of the hydrogen atom is approximately 53 picometers = 5.3 x 10^{-11}m and that it operates in a space of similar dimensions to the average energy density of the universe, 8.27 × 10^{-10} kg·m^{-1}·s^{-2} (based on ordinary matter).

It can be seen that the interaction space where gravity acts is a spatial dimension at the atomic level. Therefore, it can be understood that the composition of *G* is based on interactions at the atomic level. It can also be seen that this exists at the boundary between the micro and the macro. Therefore, it can be inferred that Gravitational constant acts as a constant that constitutes the fundamental physical properties of the entire space of the universe.

2. Analysis of the characteristics of Gravitational constant G

1. As you can see from the equation $\frac{m^3}{kg \cdot s^2}$, gravity is closely related to the energy density at the quantum level. In other words, it shows the energy density $kg \cdot s^2$and pressure of space m^3as mass energy. This is a more fundamental form of potential energy. The universe operates based on this force.

2. The fact that Gravitational constant G is a very small numerical unit 10^{-11} means that the efficiency and perfection of the system are high enough to move and operate the vast universe even at a very small level of mass energy density and pressure. On the other hand, if the G value is high, it means that more mass and energy are consumed to generate the same gravity. We can see that the current space system is structured to generate sufficient gravity even at very low energy densities.

3. The space system reliably provides energy to places where its energy must be invested. It harmoniously and stably operates the continuous creation of stars and the giant galaxy, which is the ecology of stars.

4. The ontological mechanism of space is this solid and efficient. On the other hand, it extremely restricts the use of energy in unnecessary places. Stars that have completed their existence cycle, such as supernova explosions, generate the elements that the universe needs and reconstruct them efficiently. Among these, the galaxy's star cluster, which is the axis of the universe, operates stably and harmoniously. The galaxy shows that it operates the galaxy's ecology stably by utilizing the 'space position energy' formed by its own star cluster as a huge potential energy without any separate external energy input.

3. Macroscopic Space Structure and Gravitational Constant

Gravitational constant G is generally known as a universal constant. Observational results from artificial satellites and other sources also support Gravitational constant as a universal constant. Gravitational constant G is believed to have the same value everywhere in the universe. However, examining

this fact is essential in the study of Gravitational constant G.

Review of the universality of Gravitational constant

Mass of ordinary matter: 6.41×10^{53} kg

Mass of the galaxy: 1.5×10^{42} kg

Mass of the sun: 1.989×10^{30} kg The universe shows a physical scale difference of 10^{11} to 10^{12} depending on its scale. This large difference in physical scale can affect the relationship and scale of Gravitational constant. In other words, it is necessary to examine whether Gravitational constant G can also change when the 'system' changes.

Also, even if the relationship '6.674' remains the same, the scale of the constant can change because the scale of the space itself is different. However, as we have seen above, the scale of Gravitational constant shows an essential characteristic that operates even in the space at the atomic level. Therefore, it is necessary to examine this thoroughly.

The difference in the scale of the sun (1.989×10^{-30} kg) and the galaxy (1.5×10^{-42} kg) is $1.3011\times^{11}$. However, this is only a quantitative difference in scale, and no qualitative difference has been found between our galaxy and the solar system. As seen in the CMB, the universe maintains a relatively uniform qualitative composition. In addition, observations made so far, such as those from artificial satellites, have shown that the same physical laws apply throughout the universe. In addition, on a large scale, galaxies are balanced in space and are generally distributed evenly, and the distribution of elements such as hydrogen and helium at a microscopic level is also known to be almost constant throughout the universe. This shows that the law of gravity applies equally not only to the solar system but also to the entire universe.

In addition, analysis of the spectrum of light from distant galaxies or quasars shows that the same physical laws apply as those observed on Earth. In other words, this shows that basic physical laws such as the speed of light, electromagnetic force, and atomic structure apply equally everywhere in the universe. It is also clear that there is no reason for physical laws to be complicated in nature. Therefore, it can be said that the gravitational principle and Gravitational constant G of the solar system have universal uniformity.

4. Gravitational constant G of the new natural gravity theory

In the natural gravity theory, the natural dynamical equations are expressed as follows. Here, the newly discovered Space position energy (+) shares the energy density function with the traditional Gravity energy (-).

$$U_H = \frac{1}{2}mv^2 - \frac{GMm}{r} + \alpha\frac{GMTm}{R} + \rho(r)$$

. $\frac{1}{2}mv^2$: The kinetic energy of an object. m is the mass of the object, and v

is its velocity.

. $-\frac{GMm}{r}$ Gravity energy term. G is Gravitational constant, M is the mass of the central mass, m is the mass of the object, and r is the distance between the masses.

. $\alpha\frac{GMTm}{R}$ Space position energy term, M_T is the mass of the ordinary matter in the universe, m is the individual mass, and R is the radius of the universe. $\alpha \approx 1$: an adjustment coefficient of Position energy that reflects the characteristics of the space.

. $\rho(r)$ The density term is a multidimensional energy field in which variables interact as energy density distributions. It expresses that it can be connected to the celestial space of galactic motions requiring precise mass density analysis, the identification and calculation of dark matter, the alternative analysis of space curvature in the theory of relativity, fluid dynamics, and energy field analysis in quantum mechanics. In other words, it can track and calculate mass and energy density in various fields centered on space.

· Gravitational constant G is used here as well. However, in the calculation of elastic Space position energy, that is dark energy of matter.

$F_\alpha = G\frac{m_1 m_2}{r^2}$, G= 6.67430(15)×10^{-11} $m^3s^{-2}kg^{-1}$.

This (+) Gravity energy can be understood not as an attractive force that pulls m_1 and m_2 together, but as an elastic force or repulsive force that 'pushes each other'. This can be seen as having a scalar value, not a vector value like traditional gravity. Accordingly, these can be measured and predicted in the same way as the physical quantities of existing physical systems.

Energy and mass are created in space, and they generate Space potential energy and Gravity energy through density changes. Finally, they become the power source that moves the large space system. In other words, space, energy, and mass energy density are connected to space again to form a space circulation system. This is possible because of the role of the ‘gravitational constant’ that represents the sophisticated, robust, and efficient characteristics of space. This is explained in more detail in the accompanying paper.

5. Space System and General Relativity

Einstein's theory of relativity was a groundbreaking discovery that revealed the characteristics of space through the concept of space curvature. The occurrence of space curvature is an inherent property of space and helps the smooth orbital motion of planets. However, although the general theory of relativity is useful for explaining macroscopic universe phenomena, Newton's law of universal gravitation is more suitable for explaining everyday phenomena within the Earth's

gravitational field. Gravity is the attractive force that causes masses to condense themselves in response to the pressure of the vast space. Space condenses itself as masses enter it. Gravity is not caused by curvature, but rather the spatial condensation created by gravity appears in the form of curvature.

As Kepler's theorem shows, the orbital motion of planets is governed by inertial Gravity energy. However, for the entire universe, 'Space potential energy' acts as a regulator. Mercury's perihelion orbital motion shows that 'Space potential energy' is the overall regulator of mass motion in addition to Gravity energy.

Space is the main player that integrates and operates the universe. The Big Bang theory tells us that mass-energy was created in space. Space can be seen as regulating the creation, growth, movement, and extinction of mass-energy through the gravitational constant G. Space shows that it operates the universe as a consistent circulatory system by organizing the change in mass-energy density through the gravitational constant.

6. Theoretical direct derivation of the gravitational constant G

1) Derivation of the gravitational constant through the space density gravitational equation

Gravity can also be explained by the elastic compressive force of space and the repulsive compressive force of mass. This can be an intuitive explanation of gravity as a spatial encounter of action and reaction.

The gravitational field F_g formed by the elastic compression of space F_{space} and the mass compression of celestial bodies F_{obect} can be expressed as follows.

$$F_g = F_{space} + F_{obect}$$

$$F_g = k_1 \cdot \rho_{space} \cdot V + k_2 \cdot \rho_{object} \cdot V$$

$$V = \frac{4}{3}\pi R^3$$

- F_g the gravitational field
- ρ_{space} density of space
- ρ_{object} density of mass
- V volume of mass
- k_1, k_2 density proportional constant

the density proportional constant k_1 k_2 can be derived from a simultaneous equations.

Here, the gravitational equation of the Earth can be defined as follows..

$$F_g = F_{space} + F_{obect}$$

$$F_g = k_1 \cdot \rho_{space} \cdot V + k_2 \cdot \rho_{object} \cdot V$$

$$V = \frac{4}{3}\pi R^3$$

The density proportionality constant k_1 k_2 can be derived from the simultaneous equations.

· $k_1 = 26166.3862696307/\rho_{space}$ ·*Note: $\rho_{space} \approx 9.47^{-27} kg/m^3$The critical density

· $k_2 = 5.06305602848855$

ρ_{space} is reduced in the equations. Accordingly, the gravitational acceleration can be derived from the space density-based equations and the gravitational constant can be obtained.

· Earth : $g_{earth} \approx 9.76 m/s^2$

· $G = \frac{g_{earth} r^2}{m}$=6.644×10^{-11} m^{3}s^{-2}kg^{-1}

2) Derivation of the gravitational constant through celestial motion

• Calculating the gravitational constant through Kepler's orbital equations

The square of a planet's orbital period is proportional to the cube of its semi-major axis (a).

$$T^2 = \frac{4\pi^2 m}{GMm} a^3 = \frac{4\pi^2}{GM} a^3$$

$$G = \frac{4\pi^2 a^3}{T^2 M}$$

· T planetary orbital period

·M central mass

·m Planet

a Semi-major axis

For all planets in the solar system centered around the Sun, the value of $T^2 a^{-3}$is the same.

• Calculating G values using the equation of uniform circular motion

$$V = \sqrt{\frac{GM}{r}}$$

From Newton's equation of gravitation, the equation of uniform circular motion is derived as follows. Where G is obtained

$$G = \frac{V^2 r}{M}$$

This data provides the foundation for the calculation of Gravitational constant in the Galaxy-Ordinary Matter system, ensuring consistency with the existing

gravitational constant values.

Base data : NASA Earthdata, ESA Planck satellite

Results of deriving the gravitational constant

System	Calculated G ($m^3\ kg^{-1}\ s^{-2}$)	Existing G ($m^3\ kg^{-1}\ s^{-2}$)	Difference (%)
Galaxy-Ordinary Matter (Theoretical)	6.673871×10^{-11}	6.674300×10^{-11}	0.006%
Earth-Sun (Kepler's Law)	6.671842×10^{-11}	6.674300×10^{-11}	0.037%
Sun-Galaxy (Uniform Circular Motion)	6.672747×10^{-11}	6.674300×10^{-11}	0.023%

In addition to the conventional Cavendish test method, the gravitational constant can also be measured through the space density gravitational equation and planetary motion, which are direct interactions between space and mass.

Gravity constant can be viewed as a composition of space energy density that space has designed to operate efficiently and stably throughout the Space system.

Conclusion

1. The gravitational constant shows that space is the essence of the universe.
The gravitational constant is commonly applied to various energy fields in the universe. Its scope includes not only macroscopic but also microscopic space.

$$F=-G\frac{m_1m_2}{r^2}\ ,\ F_\alpha=G\frac{m_1m_2}{r^2}$$

The gravitational constant G G $6.674\times10^{-11}m^{-3}\cdot kg^{-1}\cdot s^{-2}$ has the general composition of the space energy density index. Here, the space r^{-2} and m^{-3} belonging to the denominator show that they are the masters of not only the gravitational constant G, but also the gravity$F$ and F_α. It says that the universe is unified with the fundamental space.

2. Gravity constant expresses the essential nature and mechanism of space.
The gravitational constant G of nature has a scale of 10^{-11}, and the radius of the hydrogen atom is about 53 picometers = 5.3×10^{-11} m and the average energy density of the universe 8.27×10^{-10} $kg\cdot m^{-1}\cdot s^{-2}$ is almost the same scale. This shows that the principle of creation of gravity and the universal constant G is based on the fundamental principles and dynamical structure of nature that encompass the micro and macro worlds.

3. The gravitational constant represents an integral space world.
In addition to the existing Cavendish test method, the gravitational constant can

also be derived through the space density gravitational equation and planetary motion, which are direct interactions between space and mass. From a rich understanding of the gravitational constant, we can understand that the universe is integrated into a multidimensional configuration in a single space.

The approach of this study is the result of tracing its essence through the ontological composition of the gravitational constant.

Bibliography

Books :
1."A Brief History of Time" by Stephen Hawking (1988)
2.“Newtonian Cosmology" by David Wands (2017)
3.“The Trouble with Physics: The Rise of String Theory, the Fall of a Science, and What Comes Next" by Lee Smolin (2006)
4.“The Quantum World” by Ford, Kenneth W(2005)

Research Articles:
1."Gravitational constant" by George T. Gillies (1997)
2."Varying Constants, Gravitation and Cosmology" by Jean-Philippe Uzan (2003)
3.“The Problem of Time in Quantum Gravity" by Claus Kiefer (2009)

Online Resources:
1. NASA, Wilkinson Microwave Anisotropy Probe
https://map.gsfc.nasa.gov/
The full nine-year analysis of the time-ordered data.
2. ESA, Planck Legacy Archive
https://www.cosmos.esa.int/web/planck/publications
GAIA Mission, XMM-NEWTON Mission, Herschel Mission
3. Apache Point Observatory (APO)
https://www.sdss.org/
Publications, Education and Public Outreach

Title: Ontological scientific method for Human and Science
- Science Philosophy based on ontology

Authors: Jason Kuhun Ryoo

Affiliations: Individual researcher, his private research institute Innolab.

Jason Kuhyun Ryoo *

Innolab, 114-1303, 4-9, Jang sung Baegi_ro, DongJak_gu, Seoul, 06966, Korea

*Corresponding author Jason Kuhyun RyooEmail: visionreale@gmail.com

November 1, 2024

Seoul, Korea
InnoLab Natural Science Research Institute
visionreale@gmail.com
jasonryoo@naver.com
http://udynamics.net/

Abstract

The ontological scientific method begins with two questions:
·What is it?
·Why must it exist?
This is a fundamental question. Answering these two questions first is the methodology that science begins with.The ontological scientific method is based on the quantum worldview. The essence of existence is energy, and energy moves in the most efficient way. All existence fundamentally follows the ‘law of conservation of energy’ and the ‘principle of least action.’

The meaning of this natural language is deep and wide, encompassing the universe, nature, and humans.We can discover the essence of human subjectivity here, and we can concretize it as Human Science.

I. Ontological Scientific Method

The ontological scientific method is based on the essentialist scientific method. Therefore, it has the advantage of being able to approach the essence directly. The ontological scientific method begins with two questions.

What is it?

Why should it exist?

These are fundamental questions. The methodology that begins science and research is to answer these two questions first. Science can be said to clearly confirm the ontological basis of an object and explain the self-constituting principles and processes of existence based on this. The ontological scientific method is based on the quantum worldview. The essence of existence is energy, and energy moves in the most efficient way. All existence follows the law of conservation of energy and the principle of least action. The self-constituting of existence is based on this principle, and the world can be explained by this principle.

1. Three Characteristics of Existence

In the ontological scientific methodology, existence has the following three main characteristics.

1) Mass-energy basis:

Existence is based on mass energy, which is the basic way of existence.

2) Choosing the path of minimum energy use:

Because existence is energy itself, it is a way to conserve its energy by choosing the path of minimum energy use and moving. We humans call this efficiency or rationality.

3) Reason for existence:

Existence must have a reason for existence, and this is shown in the way of using energy efficiently without wasting it. Things that do not have a clear reason for existence are considered to be phenomena that exist for a short time and then disappear.

Based on these characteristics, existence conserves its energy and has the will to maintain continuity, stability, and homeostasis. It uses energy efficiently and has the ability to creatively transform energy.

2. Ontological scientific methodology and essentialism

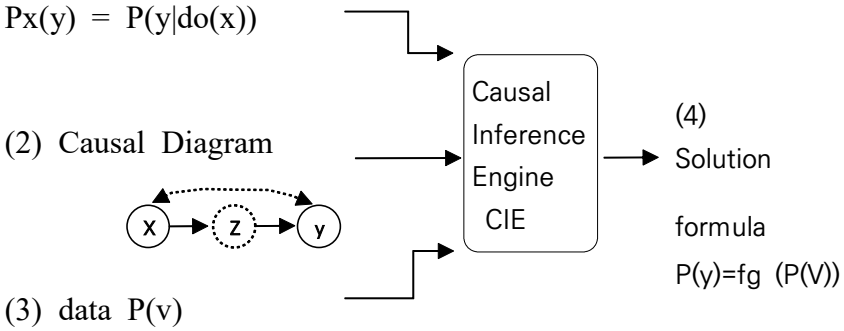
Ontological scientific methodology has an ‘essentialist method’ based on causality. This is because causality is structured along the most efficient path. An efficient path is easy to find because it is a promised path. It can continue to advance to the fundamental principle of existence without stopping at relationalism. This is because there is a more fundamental cause in the principle. Causality is connected along the path of energy conservation and minimum

action. Therefore, it can be seen that the essence of the natural principle is ‘the path of efficiency.’ This approach accepts the quantum-material worldview and revives the scientific spirit. It continues to encourage inductive challenges based on causality. This can be the best scientific methodology required to develop and implement cutting-edge technologies in the era of AI and AGI. Tasks selected from the ontological scientific method can be specified and performed according to the essentialist scientific method. Existing essentialist research can also be strengthened by adding the ontological method. The ontological and essentialist methods interact and become stronger.

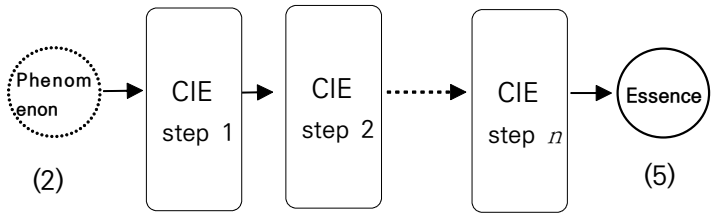
3. Essentialistic scientific method

1. Building a causal inference engine The scientific method can be continuously built up based on causal inference.

The scientific method can be continuously built up based on causal theory. Causal inference: Through Px(y) = P(y|do(x)), we can identify the causal influence of a specific variable x on another variable, and based on this, we can model the relationship between variables more accurately in P(y) = fg(P(V)).



2. Step wise continuation of linear causal inference
: Phenomenon·Essence pattern capture



1. Obtain questions (1) and solutions (4) about the research topic. Based on current knowledge, how much data (3) can be collected that can be used for the phenomenon (2) ?

2. How close can we get to the essence (5) through the step-by-step continuation of the causal inference process?

3. Multidimensional causal inference uses 'P·E pattern analysis' to capture the phenomenon-essence pattern, revealing causal relationships that were not easily revealed. Patterns form a context and are captured in a systematic configuration. The scientific method based on causal theory has continuous momentum through the CIE: Causal Inference Engine.

Conceptual structure

Group 1 Factor 1,2,3..

Causal function y = f(x) + ε(exception)
Multidimensional phenomenon data
: Phenomena group
P·E pattern analysis ↕
Essential data : Essence factor group

Group 2 ⋮ Factor 1,2,3..
Group 3 Factor 1,2,3..

Phenomenon system Y : Essence system f(X)

4. Total system interaction
   1) Essence system interaction
   2) Phenomenon system interaction
   3) Total system interaction with Essence system and Phenomenon system

The entire system Total develops into the essential system X and the phenomenon system Y. There are also exceptions (ε). The essential system X reinforces each other through internal interaction, and the phenomenon system Y also reinforces each other through interaction. They attempt to interact between X and Y while requesting strategic guidance and adjustment to the entire system Total. This type of interaction generally unfolds according to the most efficient self-organizing principle according to the given environment.

5. General causal interaction System as Natural Dynamics

As seen above, causal inquiry deepens through the inference process of $Px(y) = P(y|do(x))$ and continuously gains momentum through the CIE: Causal Inference Engine. This process starts from the individual unit, forms a group, and develops into the entire system based on the group.

1. This process can be seen as a general principle of nature.
2. This is also projected into human perception and behavior.
3. This process occurs as a general phenomenon in the human perception

system, separate from the external system. The above ‘causal system’ can be seen as a fundamental principle of nature that occurs along the path of efficiency. This dynamic pattern creates a flow that seeks a more efficient direction even in a process of trial and error that seems chaotic. However, the development process of this system is sometimes slow.

But, if we understand this natural principle, we can accelerate and strengthen this process. This can be seen as the “essentialistic scientific method.” This can also be strengthened through interaction with the ‘Ontological scientific methodology.’ Through this, we can continue to develop essentialistic scientific research based on causality.

II. Ontological Scientific Method II

The Ontological scientific method is a philosophy of science that regards beings, including humans, as the subjects of science rather than the objects of science. The Ontological scientific method is a methodology in which ontology becomes the beginning, process, and purpose of science. This could be said to be the final version of the Scientific revolution. It can be said that science has ultimately devoted itself to this purpose. The Ontological scientific method can also excel in exploring the human world and finding creative alternatives. Ultimately, all sciences lead to this path. Because nature as the foundation of science is the best ‘teacher’ anytime, anywhere, and in any science.

The Historicity of Science

The rapid development of natural science since the modern era remains a myth even today. Science was the ‘discovery of a new world’ accompanied by geographical discoveries. However, if we think about it a little, humans have lived as one world integrated with nature since they were born on Earth. Therefore, science that led civilization is a myth that was created, whether consciously or not. The myth of science is a phenomenon in which the ideology of civilization joined hands with scientific authoritarianism to dominate the world.

This is also a short period of less than 500 years since Galileo Galilei (1564-1642) and Isaac Newton (1642-1726). However, phenomena are products of necessity. Newton’s law of universal gravitation solidified scientific authoritarianism. The worldview that resulted from this planned a ‘gravitational world’ and enforced a vertical value order. Gravity is a ‘vector mode’ energy with a clear direction that anyone can feel. The greater the mass, the stronger it is. Therefore, it is easy to measure and calculate. This is a worldview that vertical power prefers.

However, nature does not only have vector energy. There is much more abundant and larger ‘scalar mode’ energy. It is the shining Sun, clear Air, clean

Water, and the ecology and life of nature. This is so abundant that it cannot be calculated. However, humans tend to think that what they do not calculate does not exist. History has forced humans into a narrow gravitational world of 'gravitational value order' that was intentionally created according to their needs. The world of the 'scalar mode', which is even greater, was largely alienated. It was considered non-existent because it was not calculated. Note 1 p.12)

Power is the one who takes advantage of this situation. Power uses this as a custom or cultural mechanism. This becomes civilization and history. As a result, this may be an inevitable phenomenon in the course of historical development.

However, humans have become increasingly distant from the original nature, and Newton's gravity created scientific authoritarianism and established itself as a 'broad general condition' in human history. Most of the achievements made through the hard work of science were taken by power. However, power could not completely protect them. Most of them were consumed in power struggles and resulting wars.

1. Human subjectivity discovered by ontological scientific method

Nature is grand yet extremely elaborate. It manages the world with the grand law of conservation of energy, while realizing precise perfection with the principle of least action. We humans try to imitate this, but it is difficult to fully digest anything. Rather, formalism that tries to imitate perfection is blocking the path to truth. A typical example is 'positivist science'. However, elaboration is always the result of grandeur. Therefore, we must advance from phenomenon to essence, from parts to wholeness. We can see the whole only when we see existence. We can see existence only when we see the whole. The Ontological scientific method first draws attention to the 'a priori subjectivity' that humans possess. It reveals that the natural subjectivity of humans is the true entity and the only complete path to the whole truth.

It is the 'discovery' that the essence of all particularities that individuals possess lies in generality. Subjectivity is realizing one's essence as generality. Therefore, the category of human subjectivity is broad and large in terms of ontology and is natural principle. This is the 'subjectivity' discovered by the 'Ontological scientific method'. This becomes existence beyond existential. It acquires generality by growing oneself and becoming oneself first. In this way, it achieves balance between oneself and the world. Therefore, all questions must be asked to oneself first.

The final answer is also given through one's own subjectivity. The quality of the answer is obtained as a result of interaction with oneself and interaction with the neighboring world. Subjectivity is the natural principled perception and execution ability of general humans. Based on this, the rationality of human empirical perception and action is defended. All of these are natural abilities and natural rights that humans are born with.

This makes us face the partiality, linearity, isolation, and closedness that existing positivist science has by asserting objectivity and objectifying existence, as well as the widespread scientific authoritarianism. This criticizes the essential properties of positivist science that are directed against the natural principled truth. This non-truthful property of science makes us deeply reflect on modern science. This critical spirit acquires the dialectical recognition that general human subjectivity has fundamental truth. It is an awakening that human subjectivity is the fundamental driving force that overcomes the limitations of science and makes science scientific.

It is insightful that the reason narrow-minded 'scientific objectivism' has gained popularity is the result of the loss of human subjectivity. It confirms that the recovery of human subjectivity is a task that can no longer be delayed in the era of Artificial intelligence.

Maturity of human subjectivity

The scientific foundation that the era demands is based on understanding and belief in human cognitive and practical abilities. This was was discovered and attempted by Immanuel Kant (1724-1804) in the past. Hegel (1770-1831) followed suit, but failed due to leaning toward idealism. Science took advantage of this chance and emerged as a leading figure in history, advocating 'positivistic objectivism.' However, as we have seen, the objectivity of science was an 'accumulation of scientific prejudice.' Partial truth cannot be truth. 'Partial' is essentially another name for 'prejudice.' Therefore, it rather becomes an obstacle to progress toward truth. This is the case with the numerous trials and errors and misfortunes we have witnessed since the Industrial Revolution. But, the more this happened, the more humans had no choice but to rely on science. This was because there was no better alternative.

However, human perception grew and began to pay attention to its own 'subjectivity.' This is also the path that Hegel, who was criticized as an idealist, predicted. It is also the path that positivist science was so wary of and even abhorred. Therefore, instinctive courage is also necessary.

This develops into the 'philosophy of subjectivism' that defends human subjectivity. The potential of human subjectivity was discovered, explored, and proposed by Edmund Husserl (1859-1938) early on. However, the sharp opposition between objectivity and subjectivity continued for a long time.

Now, we have reached the 'right timing' to make a decision. The objectivity of positivism is recognized as a half-failure scientific model that has worn the shackles of partiality. The essential reason for this is that positivism has lost its purity. The historicity that the attribute of truth lies in purity is also discovered here. In short, positivism, modern science, and market power are 'synonyms.' This is because they were all used as tools to support 'market civilization.' Market civilization is a system without an owner. This is because everyone is

too dependent on this system. Here, most resources were used for parts rather than the whole, and for power rather than individuals. Science unintentionally led this. However, this is not anyone's fault, but can be seen as an inevitable process of historical development.

I think that the dynamic and eventful history since the Industrial Revolution can be summarized in this way due to the 'regrettable page'. History is a product of necessity, and history moves forward again to necessity. Necessity often creates innovation. The times demand the restoration of human subjectivity. Subjectivity can be the best strategy to respond to the times. This is because it is the path to truth that humans and civilization have long sought.

The essence of natural subjectivity

The a priori sensibility and reason discovered by Kant can be interpreted as 'a priori subjectivity' in today's concept. This can be seen as a 'neurophysiological intellectual ability system' that humans have achieved through a long process of natural principle evolution. It can also be proven in recent brain science, neuroscience, and AI's deep neural network theory. This is a human's natural principle sense, and the inertial sense felt with the whole body and the three-dimensional five senses of five elaborately configured channels exist as entities.

First, our vision precisely perceives the rich spectrum of electromagnetic waves possessed by quantum theory light. Light is the most efficient energy transmission medium in the universe and nature. We encounter this as an essence. Hearing is sensitive to the intensity and density of wave energy. Touch measures the density of various energies in a wide range of areas. In addition, the sense of smell precisely analyzes and detects the chemical composition of the surrounding environment. Taste allows life to intuit its own fate as a multifaceted energy density. Above all, we delicately feel the dynamic movement of the universe and nature with the inertial sense felt with the whole body. The highly trained and refined physical senses of athletes prove this. We instinctively calculate and judge by sophisticated biological dynamics and hormonal harmony.

All human sensory systems share the fundamental substratum of the multidimensional physics of the universe and nature. We have this substantial cognitive system as our own subjectivity. Through it, we perceive and communicate with all things in the universe.

Since the modern era, science has failed to closely examine this fact. This practice continues even today. This may be the blindness and self-righteousness of science that it did not intend. Therefore, science forces the partial truth it has discovered as the whole. It has caused people to distrust their advanced intuitions as primitive. For a long time, science has devalued the natural fundamental abilities of humans and life as primitive.

Those who benefited from this interpretation of science were ‘market

civilization' and 'market power.' They are still very stingy in revealing the essence of human subjectivity. They show off that they are absolute teachers. Now is the time for us to pay attention to this truth. This is a big mistake, and an error that far surpasses the brilliant achievements of science.

Since human senses and intelligence come from their own needs, science cannot replace human subjectivity. Our science is a tool structurally inadequate to imitate the precise and comprehensive system of humans. However, it is suitable as a role to support and strengthen the advanced cognitive system of humans. We can see that it is essential and quick to scientificize ourselves according to natural principles rather than relying too much on science. Here, artificial intelligence AI and general artificial intelligence AGI will provide decisive help. It is time to correctly understand the nature of human subjectivity and accept it as science according to natural principles. This is a demand of the times that we should welcome.

2. Demands for Human science

Human Ontological Strategy

Human science is an ontological strategy and methodological shift of science that takes humans as the subject. This is naturalistic. It is to accept human subjectivity as a general principle of natural science, and through this, to first understand the general principles of human self-construction and creation. This was the responsibility of science that had to be done early on. This requires an essentialist scientific method based on causality. This becomes an effective method in the AI era. The Ontological scientific method has the ability to lead this.

The Ontological scientific method can be composed of methodology, ontology, epistemology, and systemsengineering theory. It helps individuals and various social organizations to achieve creative self-construction. A flexible and elastic 'natural dynamic system' can also help here. All of this can be led by the Ontological scientific method and used as a tool by the essentialist method based on causality. They can adopt a multidisciplinary cooperative system as a strategy in the direction of supporting human natural subjectivity. This may be the basic framework of 'Human science' that we can think of.

Here, Human science can actively help each individual and society to construct their own creative self based on the 'law of conservation of energy' and the 'principle of least action' according to the general principles of nature. This may also allow for customized solutions according to the conditions of each subject.

Completion of Human science

The central task of Ontological scientific methods and human science is to understand, sympathize with, and support humans. Throughout history, humans

have rarely made efforts for themselves. Most of them were devoted to social ideologies and their founders, the powers that be.

We have come to the point where we must overcome this history with Ontological scientific methods. Humans have reached the peak of material civilization and technological civilization, and have truly recovered their own subjectivity and become the true subjects of life. Humanity's scientific efforts can ultimately be seen as a process for completing 'Human science'.

Human science is a natural science that explores and supports humans and the human world. Natural science has returned from the world outside humans to the world inside humans. Human science will be a new and amazing ‘Blue ocean’ in industry and business as well. By establishing Human Science, humanity will be able to discover a new whole world and challenge the future.

Conclusion

Humans in the new era are not beings who depend on science and are objects of science, but are the subjects of science and the masters of science. The Ontological scientific method can promote and lead this. It advocates and supports the legitimacy of the subjective subjectivity of each individual human being. However, the long-standing inertia of the existing system will not allow this ‘change’ overnight. Change is achieved by changing the physical structure one by one. Change is promoted by recognizing the need and reforming oneself. This change is expected to eventually become the inevitability of history.

We need both ‘fact recognition’ and ‘subjective recognition’. This is a cognitive system for ‘fact judgment’ and ‘subjective judgment’. We should no longer hesitate and boldly raise our hands for ‘subjective judgment’. We believe and support that subjective judgment already includes factual judgment. We respect his subjectivity and defend and support her individualism. We respect and protect each individual’s different positions. All of this will achieve a natural balance through trial and error. This is the path that nature has evolved along. We can agree and support that this is a general principle of nature.

The Ontological scientific method is useful anytime, anywhere, and in any science.

·What is this?

·Why must this exist?

All questions must first be asked to one’s own subjectivity. The answer must be found in one’s own including the universal human subjectivity,. The final answer is, of course, the answer of one’s own subjectivity.

The natural principled mind allows us to see the truth as it is. Therefore, ‘Seeing as it is’ can be sufficient for us. This is because the truth is something that everyone can see.

Note 1) Comparison of gravitational energy (-) and space energy (+)

The existing Gravity energy (-) that our physics has identified helps stable movement by giving inertia to masses in a gravitational field. It is a noticeable vector-type energy. These are precisely calculated in physics.
Meanwhile, 'Space energy (+)' provides a wide range of energy to masses on a cosmic scale. It is often provided by solar energy and ecological energy such as air and water. It is a scalar-type energy without directionality. These are not calculated in physics textbooks.

$$U_H = \frac{1}{2}mv^2 - \frac{GMm}{r} + \alpha\frac{GM_Tm}{R} + \rho(r)$$

Ordinary matter M_T, individual matter m, cosmic radius R, distance between two matter r, gravitational constant G.

· $\frac{1}{2}mv^2$: The kinetic energy

· $U_{gravity} = -\frac{GMm}{r}$: Gravitational energy (-), the center of physics, is calculated with great precision.

· $U_{space} = \alpha\frac{GM_Tm}{R}$: Space energy (+), a much larger value but not yet calculated. So it is called dark energy or dark matter.

· $\rho(r)$: Energy density terms, this quantum concept is still not accurately captured in macroscopic physics.

Base data : NASA Earthdata, ESA Planck satellite

Comparison of the size of gravitational energy (-) and space energy (+)

$System$	$U_{space} = \alpha\frac{GM_Tm}{R}$	$U_{gravity} = -\frac{GMm}{r}$	$U_{space} / U_{gravity}$
Earth	1.486×10^{41}J	-5.299×10^{33}J	2.804×10^{7}
Sun	4.951×10^{46}	-8.095×10^{41}	6.116×10^{4}
Galaxy	3.734×10^{58}	-1.19×10^{54}	3.138×10^{4}
Ordinary Matter	**4.085×10^{69}**	**-4.085×10^{69}**	**1.0**

The cosmic energy (+) is a much larger value than the existing gravitational energy (-), but it is not calculated. Science shows that it lacks sufficient reflection on its own essential partiality.

Bibliography

“Tao Te Ching”, 老子Lao Tzu (BC571~)

“Great Study (University) 大學”, 子思Zisi(BC483~BC402)

“Symposium”, Plato (BC428~347)

“Metaphysics”, Aristotle (BC384~BC322)

“Hwadam House”, Seo Kyung-deok (1489~1546) Neo-Confucian scholar, The philosopher of the Monistic Energy theory-Qi 唯氣哲學, Modern quantum theorist, Honorary Prime Minister of Joseon Dynasty (Korea).

“Novum Organum”, Francis Bacon (1561~1626) 1st Viscount of Saint Alban,

“Philosophiae Naturalis Principia Mathematica”, Isaac Newton(1642~1726)

“Ethica Ordine Geometrico Demonstrata”, Baruch Spinoza(1683~1677)

“An Inquiry into the Nature and Causes of the Wealth of Nations”, Adam Smith (1723~1790)

“PhänKritik der reinen Vernunft”, Immanuel Kant (1727~1804)

“Phänomenologie des Geistes”, Georg Wilhelm Friedrich Hegel(1770~1831)

“On Liberty”, John Stuart Mill (1806~1872)

“Die protestantische Ethik und der 'Geist' des”, Max Weber(1864~1920)

“Phenomenology of Perception”, Maurice Merleau-Ponty(1908~1961)

“Coming of Age in the Milky Way”, Timothy Ferriss, 1988

“A Brief History of Time” by Stephen William Hawking 1988

“Computer database structural interpretation of Kant's epistemology”, Jason Ryoo, Author of this paper, InnoLab 2013

“A Study on the Rhetoric Teacher Isocrates' Educational Ideas”, Korean Society of Educational Thought, 2014

“Phenomenology of Husserl”, Dan Zahavi, Hangilsa, 2017

“Meta Humanities 1.0”, Jason Ryoo, Author of this paper, InnoLab 2022

“Quantum World”, Lee, Soonchil, KAIST, 2023

“The Quantum World”, Ford, Kenneth W./ Hewitt, Paul, 2005

“Artificial Intelligence: A Modern Approach”, Stuart Russell and Peter Norvig, 2020

“Foundations of Large Language Models”, Isaiah Onando Mulang, 2023

Epilogue

Social humanities is the study of social and human problems through pattern analysis and the interpretation of these problems based on natural principles to gain wisdom. From the perspective of a social humanities researcher who studied economics, physics gave more fundamental and significant implications than expected.

The fact that general principles of physics are very similar to human society and human behavioral principles. This is enough to realize that humans are part of nature and that human society is also a part of natural phenomena. The fact that various phenomena and essences of human society can be interpreted and sympathized with through general principles of physics. The high-level fundamental wisdom of natural principles can be an excellent, efficient, concise, and solid alternative for solving social and personal problems of humans. This is a topic that has been emphasized from ancient philosophy of the East and the West to modern and contemporary thought.

The mathematical natural philosophy pioneered by Kepler, Galileo, and Newton made a decisive contribution to the formation of the foundation and worldview of modern and contemporary physics. Einstein's discovery was a great innovation. The mechanical and objective interpretation of the physical world, based on a strict positivistic methodology, is a model and essence of the modern and contemporary scientific spirit. As a person who loves science, I cannot help but pay tribute to the passion for the natural truth of the researchers, their piety close to faith, and their deep spirit of inquiry. The sophisticated and thorough scientific nature of the mathematical natural philosophy they revealed is also an example of the greatness of the human spirit and modern and contemporary civilization and culture.

This 'scientific nature' that humans have acquired is surprising and admirable. However, we can never stop here. This is because the abstractness of science always has a gap with the essence. Moreover, the structural limitations of the current scientific method, such as its partiality, linearity, isolation, and closure, are tasks that everyone agrees on and must overcome. This is because they are all characteristics that are opposite to the truth. If we realize that the principles of natural science are principles for humans, the essential reform of the scientific method and the ontological leap will provide a fundamental innovation in the journey toward the principles of nature.

This discovery of (+) gravity is seen as having great implications for the fundamental expansion of our cognitive world and the recovery of forgotten human subjectivity. I believe that this 'humility' that we have within ourselves will always guarantee wise and prosperous development for the future of science, civilization, and humanity.

Author Profile

Biography

Jason Kuhyun Ryoo
Born in 1957
Residing in Seoul, Korea
Graduated from Hanyang University,
Department of Economics
Worked LG Group for 20 years
Founded a business firm and managed for 14 years
Established InnoLab, a social humanities research institute in 2013

Originally, I loved scientific research, and added Eastern and Western philosophy and history to it, and gained a comprehensive understanding of general natural science, quantum physics, computer engineering, and artificial intelligence, as well as experience in the IT business.

Books :

1. 2013, Philosophical essays written with common sense of hope
2. 2022, Meta humanities 1.0
   Aphorism Cafe

Research Articles:

1. 2013, Computer database structural interpretation of Kant's epistemology
2. 2021, General theory of Human science
3. 2023, General theory of systems engineering for AI &GI:
   2023, Neurophysiological a priori epistemology and general structure of AGI architecture
4. 2024, Ontological scientific method for Human and Science
   2024, Space Time and Existence
   2024, Natural Gravity Theory Based on Ontology
   2024, Study of the Gravitational constant G based on Space dynamics

Global shared webpage: http://udynamics.net/
http://udynamics.net/sub01.html (Korean)
http://udynamics.net/en/index.html (English)

Facebook: facebook.com/jasonryoo/

Acknowledgements

1. Thank you for reviewing my manuscript.
2. I respect the essence and unity of humans and nature, life and science. I also value both human intuition and scientific rationality. On this basis, I have the 'Ontological scientific method' based on causality as my research method and strategy.
3. This study is also the result obtained using the same methodology. It is a fundamental topic and has high methodological universality and originality. The paper may be a little long, but I ask for your generous understanding.
4. If you need supplementary materials or if there was any ambiguity in the translation process, please send me an email at any time and I will respond promptly.

Email:visionreale@gmail.com

Yours sincerely,
November 1st, 2024
Jason Kuhyun Ryoo

A World Told by Ontology

Published November 4, 2024
Author Ryu Gu-hyeon

Publisher InnoLab.

Address 04373, # 1620 Cheongpa-ro 40, Yongsan-gu, Seoul, Korea
Tel. 02-2654-0786
Fax. 02-6351-8166
E-mail jasonryoo@naver.com
Homepage udynamics.net
ISBN 979-11-950907-6-1

$20.50
visionreale@gmail.com
facebook.com/jasonryoo