Positive, Negative and Neutral Law of Universal Gravitation

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Abstract: According to the viewpoints of "one divides into two", "one divides into three" (e.g. Neutrosophy) and "one divides into many", at present there exist six kinds of matter in the universe altogether (one divides into six). If there exists the ordinary matter (called matter for short), there must exist its opposite. However there may exist more than one kind of its opposite, today the known opposites of matter may be the antimatter and dark matter; Other three kinds of matter are the neutral ones: the first neutral matter between matter and antimatter (Prof. Smarandache named it unmatter), the second neutral matter between matter and dark matter, and the third neutral matter between antimatter and dark matter. Similarly, if there exists the original "law of universal gravitation" (positive law of universal gravitation), there must exist its opposites (negative laws of universal gravitation), and the neutral ones (neutral laws of universal gravitation). According to this analysis, it is impossible to find the unified and ultimate gravitational theory.

Key words: One divides into two; one divides into three; one divides into many; Neutrosophy; six kinds of matter; positive (original) law of universal gravitation; negative law of universal gravitation; neutral law of universal gravitation

1   Introduction

In philosophy, there exist the viewpoints of "one divides into two", "one divides into three" (e.g. Neutrosophy) and "one divides into many".

In fact, "one divides into three" has existed since ancient times. The most early and most famous one may be presented by the Miao national minority in China. As well-knew from the historical document, several thousand years ago the Miao national minority worshiped the sun, moon and star. In addition, the Miao national minority thought that the universe is composed of the three substances of water, fire and air. As early as before Yellow Emperor's years, the Miao national minority sages proposed the viewpoint of "one divides into three (positive, negative, and neither positive nor negative)".

The Confucian doctrine of the mean idea was also proposed based on "one divides into three".

Mao Zedong said: "The Confucian doctrine of the mean idea proposed by Confucius (Kong Zi) is a big discovery and a big merit, also is the important category in philosophy, and is good for explaining well."

The position of golden mean pursued by the mean idea is the optimized one of the third kind of position, also located at the "critical position" between the maximum extent and the minimum extent.

In 1995, Neutrosophy is proposed by Florentin Smarandache.

Neutrosophy is a new branch of philosophy that studies the origin, nature, and scope of neutralities, as well as their interactions with different ideational spectra.

This theory considers every notion or idea <A> together with its opposite or negation <Anti-A> and the spectrum of "neutralities" <Neut-A> (i.e. notions or ideas located between the two extremes, supporting neither <A> nor <Anti-A>). The <Neut-A> and <Anti-A> ideas together are referred to as <Non-A>.

Neutrosophy is the base of neutrosophic logic, neutrosophic set, neutrosophic probability and statistics used in engineering applications (especially for software and information fusion), medicine, military, cybernetics, physics.

Neutrosophic Logic is a general framework for unification of many existing logics, such as fuzzy logic (especially intuitionistic fuzzy logic), paraconsistent logic, intuitionistic logic, etc. The main idea of NL is to characterize each logical statement in a 3D Neutrosophic Space, where each dimension of the space represents respectively the truth (T), the falsehood (F), and the indeterminacy (I) of the statement under consideration, where T, I, F are standard or non-standard real subsets of $]^-0, 1^+[$ without necessarily connection between them.

As for the "three" in "one divides into three", it may have many kinds of denotation. For Miao national minority sage, the denotation is as follows: positive, negative, and neither positive nor negative; for the mean idea is maximum extent, minimum extent, and mean; for the Neutrosophy is <A>, <Anti-A>, and <Neut-A>.

Considering the matching with the "matter" and the "law of universal gravitation", we think that the "three" in "one divides into three" should be denoted as positive, negative, and neutral.

According to the viewpoint of "one divides into two", if there exists the ordinary matter (called matter for short), there must exist its opposite. However there may exist more than one kind of its opposite, today the known opposites of matter may be the antimatter and dark matter; based on this, according to the viewpoints of "one divides into three" and Neutrosophy, other three kinds of matter are the neutral ones: the first neutral matter between matter and antimatter (Prof. Smarandache named it unmatter), the second neutral matter between matter and dark matter, and the third neutral matter between antimatter and dark matter. Therefore, at present there exist six kinds of matter in the universe altogether (one divides into six).

Discussing these six kinds of matter, we must have many kinds of gravitation theory.

2   Many kinds of gravitation theory

According to the viewpoints of "one divides into three" and Neutrosophy, if there exists the original "law of universal gravitation" (positive law of universal gravitation), there must exist more than one kind of its opposite (more than one kind of negative law of universal gravitation), and more than one kind of the neutral one (more than one kind of neutral law of universal gravitation).

In fact, the negative law of universal gravitation may be constructed with many methods (the negative law of universal gravitation may be processed with "one divides into two", "one divides into three" (e.g. Neutrosophy) and "one divides into many").

Now we only list two ways to construct the negative law of universal gravitation: The first way is that the content or form will be completely opposite to the positive law of

universal gravitation; the second way is considering how to replace the positive law of universal gravitation.

For example, the negative law of universal gravitation that the content or form will be completely opposite to the positive law of universal gravitation may have: The antimatter law of universal gravitation for processing antimatter, the first neutral matter law of universal gravitation for processing the first neutral matter between matter and antimatter, the dark matter law of universal gravitation for processing dark matter, the second neutral matter law of universal gravitation for processing the second neutral matter between matter and dark matter, the third neutral matter law of universal gravitation for processing the third neutral matter between antimatter and dark matter, and so on.

While the negative law of universal gravitation to replace the positive law of universal gravitation may have: the general theory of relativity, the revised general theory of relativity, super-gravity theory, and so on.

In the above mentioned various negative laws of universal gravitation, some have been proposed, for example, the antimatter law of universal gravitation, the general theory of relativity, the super-gravity theory and so on; some haven't been proposed, for example, the second neutral matter law of universal gravitation, the third neutral matter law of universal gravitation and so on.

As well-known, the Newton's law of universal gravitation reads

$$F = -\frac{Gm_1m_2}{r^2} < 0, \qquad G, m_1, m_2 > 0 \tag{1}$$

While according to ISO-mathematics [2], the antimatter law of universal gravitation reads

$$F^d = -G^d \times^d m_1^d \times^d m_2^d /^d r^d \times^d r^d > 0, \qquad G^d, m_1^d, m_2^d < 0 \tag{2}$$

where, $\times^d = -\times$, $/^d = -/$, $n^d = -n$, all of them are the ISO-mathematics operation principles.

The gravitational field equation of the general theory of relativity to replace the positive law of universal gravitation reads

$$R_{ik} - \frac{1}{2} g_{ik} R = -\kappa T_{ik} \tag{3}$$

At present, many scholars already proposed that the general theory of relativity should be revised. For example, Prof. Smarandache already proposed that there is no speed barrier in the universe [3]. According to this supposition, the general theory of relativity should be revised.

Similarly, the neutral law of universal gravitation also may be constructed with many methods (the neutral law of universal gravitation may be processed with "one divides into two", "one divides into three" (e.g. Neutrosophy) and "one divides into many"). Now we only list three ways to construct the neutral law of universal gravitation: The first way is to create another kind of the law of universal gravitation that neither positive law of universal gravitation nor negative law of universal gravitation, in which the so-called "side law of universal gravitation" (revise the law of universal gravitation from side face) should be mentioned specially; the second way is to create another kind of the law of universal

gravitation containing positive law of universal gravitation and negative law of universal gravitation; of course the proportions of positive law and negative law, besides 5:5, may also be 6:4 or 4:6, 7:3 or 3:7, 8:2 or 2:8, 9:1 or 1:9 and so on; the third way is the combination of above mentioned two ways, namely the combination of positive law of universal gravitation, negative law of universal gravitation, non-positive law of universal gravitation and non-negative law of universal gravitation.

For the neutral law of universal gravitation or side law of universal gravitation besides positive and negative law of universal gravitation, there are two forms at least. The first one is the non-inverse-square law of gravitation; the second one keeps the form of inverse square law but the gravitational constant is variable, namely it becomes the gravitational coefficient.

For the first form, namely the non-inverse-square law of gravitation, it can be written as the form of fractal distribution as shown in reference [4].

Supposing the non-inverse-square law of gravitation can be written as follows

$$F = -f(r, G, M, m) \qquad (4)$$

where G is the gravitational constant in common use, equal to $6.67\cdots\times10^{-11}\,\text{N}\bullet$
m^2/kg^2;

Transforming it into the form of variable dimension fractal, we have

$$f(r, G, M, m) = \frac{GMm}{r^D} \qquad (5)$$

The value of D is as follows

$$D = \frac{\ln(GMm) - \ln f(r, G, M, m)}{\ln r} \qquad (6)$$

For the second form, namely keeping the form of inverse square law but the gravitational constant is variable, in reference [4] the formula is given as follows

$$F = -\frac{G*Mm}{r^2} \qquad (7)$$

The general changing rule for the gravitational coefficient $G*$ is as follows

$$G* = Gr^{2-D} \qquad (8)$$

For example, for the problem of the gravitational defection of light around the sun, from reference [4] we have

$$G* = G(1 + 1.5\frac{r_0^2}{r^2})$$

where r_0 is the shortest distance between the sun and light.

From reference [5], for the problem of the gravitational defection of light around the sun, it gives

$$G \leq G* \leq 2.5G$$

While for the problem of the advance of Mercury's perihelion, it gives

$$(1 + 5.038\times10^{-8})G \leq G* \leq (1 + 1.162\times10^{-7})G$$

As for another kind of the law of universal gravitation containing positive and negative law of universal gravitation, it may be the improved Newton's law of universal gravitation given by the results of the general theory of relativity.

For this purpose, the ISO-law of gravity can be defined by

$$\hat{F} = F\hat{I} = -\frac{GMm}{r^2}\hat{I}$$ (9)

where, the self-increased Isounit reads

$$\hat{I} = 1 - kF = 1 + k\frac{GMm}{r^2}$$ (10)

For the problems of the advance of planet's perihelion and the gravitational defection of a photon orbit around the sun, to compare the results of general relativity and the results given by the Newtonian mechanics with Eq.(9), the value of k in Eq.(10) should be as follows

$$k = \frac{3p}{mc^2}$$ (11)

Then we have the following improved universal gravitation formula, namely the ISO-law of gravity

$$\hat{F} = -\frac{GMm}{r^2} - \frac{3G^2M^2mp}{c^2r^4}$$ (12)

where: G is gravitational constant, M and m are the masses of the two objects, r is the distance between the two objects, c is the speed of light, p is the half normal chord for the object m moving around the object M along with a curve derived by the existing Newtonian mechanical formula Eq.(18), and the value of p is given by: p = a(1-e^2) (for ellipse), p = a (e^2-1) (for hyperbola), p = y^2/2x (for parabola).

Thus, for the problems of the advance of planet's perihelion and the gravitational defection of a photon orbit around the sun, with the Newtonian mechanical method, Eq.(12) will derive the same results as given by general relativity.

As for the third way neutral law of universal gravitation combining the first and second way neutral law of universal gravitation, it is required when we simultaneously discuss the gravitational problems related to matter, antimatter, dark matter, the first neutral matter between matter and antimatter, the second neutral matter between matter and dark matter, and the third neutral matter between antimatter and dark matter. Namely we should present the most complicated neutral law of universal gravitation combining the positive, negative, non-positive, non-negative law of universal gravitation and the like. For the reason of complexity, this kind of neutral law of universal gravitation should be discussed in future.

3   Conclusion

This paper proposes the problems related to the positive, negative and neutral law of universal gravitation, and provides the new idea to further study the gravitational question.

It should be noted that, according to this paper's analysis, it is impossible to find the unified and ultimate gravitation theory. The reason for this is that, for any gravitational

theory, there must exist its opposite theory, as well as the neutral theory between these two theories.

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