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Analytical Conclusion of the Physical Constants Based on Classical Conceptions

Key words: gravitation, geocentric constant, Plank's constant, charge, electron, speed.

Analytical expressions were derived for the main physical constants. A conclusion about inconstancy of kavendishev gravitation constant and possibility of gravitation mutual repulsion of solids was made.

As it is known, centric constants being used in astrophysical calculations have two forms of noting. For example, geocentric constant

$$A = \gamma M, \qquad (1)$$
$$A = V^2 R \quad , \qquad (2)$$

where γ – kavendishev gravitation constant, M – the Earth mass, V^2 - the potential of corresponding gravitation surface, R – the distance from this surface to the Earth's center.

For the specialists it is important to know if γ is really universal constant. But nobody beginning from Newton till nowadays can answer this question. In this report the author proposes his own version of solution and its result.

In this report all formulas are given in the International System of Units (System of Measurements).

In formula (1) γ is a coefficient being derived under laboratorial conditions, which was then transferred to astronomic scale. This coefficient is supposed to be invariable. Its checking is made by observing the movement of the space solids, comparing them with there centric constants using formula (2). If to consider that the globe is abstract geometrical object, then formulas (1) and (2) describe one of its external properties. Moreover, the explorer who is inside the object performs this property using formula (1) and the explorer who is outside the object – uses formula (2). If to compare (1) and (2) for trustworthiness of calculated geocentric constant more preferable is formula (2).

Let's examine in details the physical essence of the parameters included into it. Imagine the dot's circular rotation on radius R. It is geometrical composition of its two linear movements in orthogonal directions. Using these directions as axes x and y let's put on them the distances being passed by the dot (look figure1). Let the rate V be constant and 1,5 m per sec. (as an example). Let's mark the way passed through the intervals of time t which are divisible by1 sec. In figure 1 the distances in 1,2 and 3 sec. are shown. As a result we got rectangles with squares S_1, S_2, S_3 which were increasing in uniformly accelerated paces in accordance with the formula

$$S = V^2 T^2 , \qquad (3).$$

In this case squared rate V^2 plays role of acceleration.

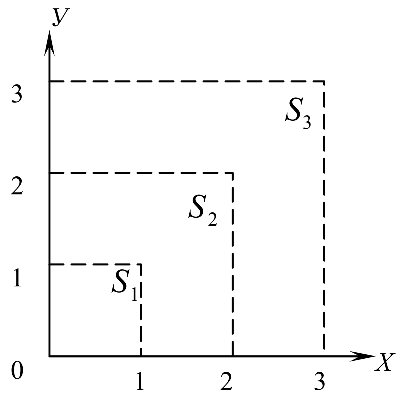

Fig 1 – If the dot moves with constant speed simultaneously in two orthogonal directions X and Y the rectangle's square S increases in uniformly accelerated paces.

In more general case

$$V^2 = V_1 V_2 \ , \qquad (4)$$

where V_1 and V_2 – orthogonal elements of movement's rate.

As a result we can affirm that the potential V^2 of gravitation surface perform the rate of its square alteration (squared acceleration).

Fig 1

In the literature devoted to the Common Theory of Relativity (CTR) such surface is shown as swelling sphere (ball). But it is false in reality. The square of the sphere is $4\pi R^2$ and the square of the closed gravitation surface (g-surface) according to formula (3) is $4\pi^2 R^2$. The rate of volume alteration seized by this surface is equal to centric constant of gravitation object (it may be called as cubic acceleration). That' why formulas (1) and (2) may be rewritten as

$$A = V^2 R = \frac{4\pi^2 R^3}{T^2} = \gamma M \ , \qquad (5)$$

where T – time of one rotation with rate V along the g-surface.

As a result the last formula follows Kepler's laws and Newton's law of gravity. So the properties of centric constant are the fundamental base of the celestial mechanics laws.

It should be notified that for the physical solid the first g-surface is the surface of alteration of the gravitation gradient's direction (SAGGD). For the globe it doesn't coincide with its firm border (fig 2) because of atmosphere existence. That's why for the external observer the Earth's radius is radius of its SAGGD.

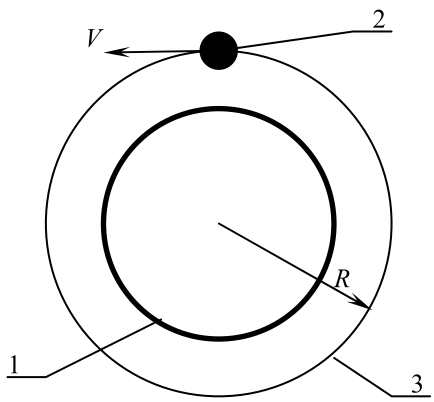

Fig 2
The circular movement of the solid with the mass m with the first space velocity (7.9 km/sec.) around the Earth : 1 – the globe, 2 – a solid, 3 – SAGGD, R – its radius.

Further on we shall need analytical correlation for Plank's constant . For this let's use fig 2. Potential energy of the solid 2 is: $W = mV^2$. Multiply W by period of rotation T and find the value

$$H = mV^2 T = mV 2\pi R \ . \qquad (6)$$

This expression , conformably to the hydrogen atom, is able to give the value of Plank's constant

$$h = m_e V_b 2\pi\ R_b, \qquad (7)$$

where m_e – electron mass, V_b – speed on the first Borovskoi orbit, R_b – its radius.

Taking into consideration figure 2 one can say the formula (7) shows the product of energy which should be expended for taking out the electron mass to the first g-surface of the hydrogen atom and the period of rotation along this surface. The electron rate at the Borovskoi sphere in some sense may be called as the first space velocity in the hydrogen atom.

The expression for centric constant (CC) may be used also while describing the microworld's properties. For example, CC of the hydrogen atom is

$$V_b^2 R_b = c^2 r_o \quad , \qquad (8)$$

where c – velocity of light, v_o – classical electron's radius.

The existence of Plank's constant is obliged to the centric constant (8) and the microworld's quantizing (about possibilities of trajectory existence which are not laying on the diametrical flatness of solids look [1]).

From (8) one can get the thin structure's constant:

$$\alpha = \frac{V_b}{c}. \qquad (9)$$

Taking into consideration what was said above one can find correlation for elementary charge. For this let's use formula of the thin structure's constant from quantum electrodynamics

$$\alpha = \frac{\mu_o c e^2}{2h}, \qquad (10)$$

where μ_o – magnetic constant.

Putting into (10) values of h and α from (7) and (9) we get the expression for electron charge

$$e = \frac{V_b}{c}\sqrt{m_e R_b 10^7}, \quad (11)$$

but using formula (8) one can get another version

$$e = \sqrt{m_e r_o 10^7}. \qquad (12)$$

What can mean the physical essence of this expression?

In quantum theory it is considered that as a result of vacuum zero fluctuations electron-positron pairs appear and disappear persistently. The author supposes that this process is a dynamic symmetry of the Universe [6]. It means that physical world exists, conditionally speaking, interpenetrating universes: "positive" and "negative". If conditionally to consider that our Universe is "positive" then the birth of electron with mass m_e and volume with radius r_o corresponds to the birth of the particle in the "negative" universe in which our mass inverts to the volume with radius r_o and our volume with radius r_o inverts to the mass which is equal to m_e. It means that the value of $\sqrt{m_e r_o}$ is linear size of universe element which we call "charge".

From formula (11) the physical sense of charge's sign becomes clear: it is determined by relative direction of rates V_b and c (moreover, one should consider that direction is the element V_b along the normal to g-surface).

We got formulas (7), (9), (11) and (12) which include only fundamental constants. That's why one can use them in all known physical formulas for revealing the physical essence of phenomenon being described by them.

We got to know that quality correlation for the centric constants "works" in the microworld too. Let's use its feature (1) and (2) for calculating gravitation constant of the electron. Designate it as γ_e. Using (8) $m_e\gamma_e = V_b^2 R_b$ we can get

$$\gamma_e = \frac{V_b^2 R_b}{m_e}, \qquad (13)$$

Its numeral value equals

$$\gamma_e = \frac{(2.187691397\cdot10^6)^2\cdot5.29177249\cdot10^{-11}}{9.1093897\cdot10^{-31}} = 2.780250967\cdot10^{32},$$

which is $4.17\cdot10^{42}$ times more than astronomic γ

$$\frac{\gamma_e}{\gamma} = \frac{2.780251\cdot10^{32}}{6.67259\cdot10^{-11}} = 4.17\cdot10^{42}. \qquad (14)$$

The result means that γ is not a constant! Now let's ascertain on which parameters depends its magnitude. For this let's use formula (11) and Kulon's law.

The power of charges interaction in vacuum is $F = \frac{e_1 e_2}{4\pi\varepsilon_o r^2}$, where ε_o – electric constant, r – distance between charges. Open the value of ε_o and rewrite formula again

$$F = 10^{-7} c^2 \frac{e_1 e_2}{r^2}, \qquad (15)$$

In formula (11) parameters V_b, m_e and R_b are constants because of the microworld's quantizing. Suppose that they can accept another values. Then for arbitrary solid of special form we can write

$$e = \frac{V}{c}\sqrt{mR\cdot10^7}, \qquad (16)$$

where V – rate on the first g-surface of the solid (the first space velocity), m – solid mass, R – radius of the first g-surface. Putting (16) to (15), one can find the power of interaction of two solids

$$F = \frac{V_1 V_2\sqrt{m_1 R_1 m_2 R_2}}{r^2}, \qquad (17)$$

where indices 1 and 2 mean the number of corresponding solid. Let's group the elements in order to separate the part of the formula which will correspond to traditional note of Newton's gravity law

$$F = V_1 V_2 \sqrt{\frac{R_1 R_2}{m_1 m_2}} \frac{m_1 m_2}{r^2}. \qquad (18)$$

From (18) we get the expression for kavendishev gravity "constant"

$$\gamma = V_1 V_2 \sqrt{\frac{R_1 R_2}{m_1 m_2}}. \qquad (19)$$

Now it is clear on which parameters depend its magnitude. Rewrite (19) in the following way: $\gamma = \sqrt{\frac{V_1^2 R_1 V_2^2 R_2}{m_1 m_2}}$. Under the root in numerator there is the product of centric constants, so we can write

$$\gamma = \sqrt{\frac{A_1 A_2}{m_1 m_2}}. \qquad (20)$$

Let's check in numeral (20) on the system the Earth – the Moon, using reference data:

$$\gamma = \sqrt{\frac{398600.5 \cdot 10^9 \cdot 4902.69 \cdot 10^9}{5.972 \cdot 10^{24} \cdot 7.3455 \cdot 10^{22}}} = 6.674 \cdot 10^{-11}$$

Using (1) and (2) formula (20) is transferred into

$$\gamma = \sqrt{\gamma_1 \gamma_2}, \qquad (21)$$

where γ_1 and γ_2 are kavendishev constants of the first and second solids. So to each solid corresponds its own gravitation constant. For two and more solids it differs generally because of alteration of solid's density (fig 3).

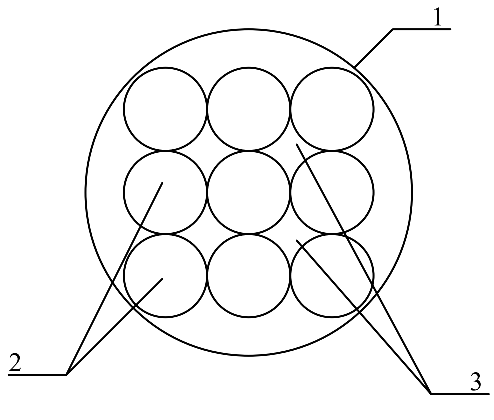

Fig 3
the density of the atomic nucleus differs from the density of the nucleons, of which it consists, because between them spaces appear: 1- nucleus border, 2- nucleons, 3- spaces between nucleons.

If to spread the scheme (fig 3) to the atoms, molecules, etc., than it becomes clear why gravity constant γ of the microobjects differs so much from the electronic γ_e (look (14)). More precise definitions of kavendishev gravity constant γ in the world's laboratories show insufficient similarity of the results (look through the table 1).

The specialists saw the reason of it in the error of experiments. But according to (19) discrepancy in results really must be if for the measurements in experiments different solids were used.

Table 1.

Authors and year of experiment	Value $x10^{-8}cm^3\left(g\cdot s^2\right)^{-1}$
L. Fasi, K. Pontikis (France, 1972)	6.6714 ± 0.0006
M.V. Sagitov, V.K. Milyukov and others (USSR, 1978)	6.6745 ± 0.008
J. Lazer, W. Towler (USA,1982)	6.6726 ± 0.0005

As for modern value γ, which is used in astronomic calculations, it's still not possible to distinguish with sure variations of its magnitude. Achieved precision doesn't allow to do it. Formula (18) reveals a new property of the gravitation interaction of the objects which is absent in the famous formula of Newton's gravity law: depending on the signs of rates V_1 and V_2 power F also may have different sign. The last result performs that the solids can not only mutually attract to each other, but under mentioned conditions mutually push off from each other.

Conclusion

So, with the help of the laws of classic physics analytical expressions for fundamental physical constants are deduced. A conclusion about inconstancy of kavendishev gravity "constant" and possibility of gravitation mutual repulsion of solids was made. Derived formulas reveal the physical essence of phenomenons and effects being described by famous expressions. For precision and checking derived results it's necessary to continue theoretical and experimental explorings.

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