

Content

Content	1
Content GRAVITATIONAL EQUATION OBTAINED FROM THE MODIFIED MAXWELL FORMULAS	1
CASE OF WRONG SIGN IN MAXWELL EQUATION	5
ORIGIN OF GRAVITATIONAL FIELD	5
EXPERIMENTAL VERIFICATION	6

GRAVITATIONAL EQUATION OBTAINED FROM MODIFIED MAXWELL FORMULAS

In the article will be derived an equation of gravitational field from the Maxwell¹ ones. It will be based on the analysis of behavior of action to the empty space. Electric field attracts empty space and Gravity field rejects it on the same way the Magnetic one does the same regarding Meissner² effect. The kind of pole of a field does not have influence to the direction of force acting on the empty space. It depends of the field only.

The gravitational and electrostatic fields both have similar formulas for their magnitude. The general formula for field between two poles in E³ space is:

$$\vec{A}_{t_p} = k \cdot \frac{p_2 \cdot (1 + (i-1) \cdot \delta_{1,t_p})}{\vec{r}^2} \cdot \frac{\vec{r}}{|\vec{r}|} \quad (1)$$

The general formula for force existing between these two poles in E³ space is:

$$\vec{F} = k \cdot \frac{(p_1 \cdot (1 + (i-1) \cdot \delta_{1,t_{p1}})) \cdot (p_2 \cdot (1 + (i-1) \cdot \delta_{1,t_{p2}}))}{\vec{r}^2} \cdot \frac{\vec{r}}{|\vec{r}|} \quad (2)$$

Whereas:

- p = quantity value of the pole charge,
- k = constant of the field,
- t_p = type of field and it is 0 or 1: the 0 is value for electrostatic, and the 1 is value for the magnetic and gravitational fields,
- r = radius between poles,
- i = $\sqrt{-1}$, i.e. imaginary unit,
- $\delta_{x,y} = \begin{cases} 1, & x = y \\ 0, & x \neq y \end{cases}$

¹ James Clerk Maxwell, 1831-1879

² Meissner-Ochsenfeld effect is discovered by Walter Meissner and Robert Ochsenfeld in 1933.

With the Archimedes force formula can be derived force of the repulsion of globe without the field from the pole:

$$\vec{F} = \oint_S \vec{P} \cdot d\vec{S} = \int_V \vec{\nabla} P \cdot dV = \int_V \vec{\nabla} \left(\frac{dU}{dV} \right) \cdot dV = \int_V \vec{\nabla} \left(\frac{k \cdot \frac{p \cdot (1 + (i-1) \cdot \delta_{1,t_p})^2}{r^2}}{8 \cdot \pi \cdot k} \right) \cdot dV \quad (3)$$

Where are:

- p = the charge of the field's pole,
- t_p = type of the field, $t_p \in [0, 1]$,
- d = the distance from the center of vacuum globe to field's pole,
- r = radius of the vacuum globe.

Solution of equation (3) is:

$$F = k \cdot \frac{p^2 \cdot (-1)^{t_p}}{4} \cdot \left(\frac{r \cdot (d^2 + r^2)}{d \cdot (d^2 - r^2)^2} - \frac{\text{Ln}\left(\frac{d+r}{d-r}\right)}{2 \cdot d^2} \right) \quad (4)$$

With an observation of formulas for mechanics, changing of direction of time would be identical to change of t_p value in formula (2).

If we imagine two equally charged poles rambling from each other due of they mutual repulsion force, and after a while time arrow is changed, we will obtain situation identical to interaction of two masses – these two poles would start with mutual attraction, just as they are masses.

Now, we can form the Maxwell equations that deal with gravitational field by changing the axe of time only.

First Maxwell equation is:

$$\vec{\nabla} \times \vec{E} = -\frac{\partial \vec{B}}{\partial t} \quad (5)$$

The second one is:

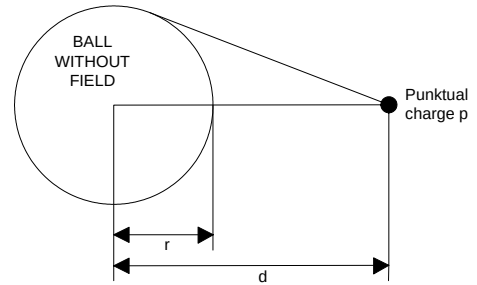
$$\vec{\nabla} \times \vec{B} = \frac{1}{c^2} \cdot \frac{\partial \vec{E}}{\partial t} \quad (6)$$

For the case of electromagnetic field connection between energy density and the magnitude of field are given by:

$$\rho_{U_E} = \frac{\varepsilon \cdot \vec{E}^2}{2} \quad (7)$$

And

$$\rho_{U_B} = \frac{\vec{B}^2}{2 \cdot \mu} \quad (8)$$



If we change direction of time in (4) and (5) we will obtain the case of gravitation:

$$\vec{\nabla} \times \vec{G} = \frac{\partial \vec{D}}{\partial t} \quad (9)$$

And

$$\vec{\nabla} \times \vec{D} = -\frac{1}{c^2} \cdot \frac{\partial \vec{G}}{\partial t} \quad (10)$$

Additional equation is:

$$\vec{\nabla} \cdot \vec{G} = -4 \cdot \pi \cdot \gamma \cdot \rho \quad (11)$$

Whereas ρ is mass density and γ is gravitational constant.

Formulas for energy density analogous to (7) and (8) and has to be:

$$\rho_{U_{\vec{G}}} = 2 \cdot \pi \cdot \gamma \cdot \vec{G}^2 \quad (12)$$

If we choose the same ratio of energy units as in electromagnetic we have:

$$4 \cdot \pi \cdot \gamma \cdot \zeta = \frac{1}{c^2} \quad (13)$$

Now we have:

$$\rho_{U_{\vec{D}}} = \frac{\vec{D}^2}{2 \cdot \zeta} \quad (14)$$

The dynamic gravitational field is not defined yet, so it can be choused any unite for it. Their convenient form is the one where dynamic field has the same energy density as static gravity field because the case leads us to symmetric equation (9) and (10):

$$\vec{\nabla} \times \vec{G} = \frac{1}{c} \cdot \frac{\partial \vec{D}_a}{\partial t} \quad (15)$$

And

$$\vec{\nabla} \times \vec{D}_a = -\frac{1}{c} \cdot \frac{\partial \vec{G}}{\partial t} \quad (16)$$

Where is:

$$\vec{D} = \frac{1}{c} \cdot \vec{D}_a \quad (17)$$

Equation (14) becomes:

$$\rho_{U_{\vec{D}_a}} = \frac{\vec{D}_a^2}{2 \cdot c^2 \cdot \zeta} = \frac{\vec{D}_a^2}{2 \cdot \zeta_a} \quad (18)$$

Equation (13) becomes:

$$4 \cdot \pi \cdot \gamma \cdot \zeta_a = 1 \quad (19)$$

Regarding formula (19) equation (18) may be written in the following form:

$$\rho_{U_{\vec{D}_a}} = \frac{\vec{D}_a^2}{2 \cdot \zeta_a} = 2 \cdot \pi \cdot \gamma \cdot \vec{D}_a^2 \quad (20)$$

And that is the same form as equation (12). If we assume that dynamic part of gravitational field $\vec{D}_a$ is imaginary part, i.e.:

$$\vec{G}_{im} = \vec{D}_a \quad (21)$$

Equations (15) and (16) can be written in following form now:

$$\vec{\nabla} \times \vec{G}_{re} = \frac{1}{c} \cdot \frac{\partial \vec{G}_{im}}{\partial t} \quad (22)$$

And

$$\vec{\nabla} \times \partial \vec{G}_{im} = -\frac{1}{c} \cdot \frac{\partial \vec{G}_{re}}{\partial t} \quad (23)$$

After multiplying equation (23) with imaginary unit i and then addition with equation (22) we have the final equation of gravitation field:

$$\boxed{i \cdot c \cdot \vec{\nabla} \times \vec{G} = \frac{\partial \vec{G}}{\partial t}} \quad (24)$$

Approximation of above equation for moving mass is:

$$c \cdot \vec{G} = i \cdot \vec{G} \times \vec{v} \quad (25)$$

Regarding (12) and (20) formula for total energy density is:

$$\rho_U = 2 \cdot \pi \cdot \gamma \cdot (\vec{G}_{re}^2 + \vec{G}_{im}^2) = 2 \cdot \pi \cdot \gamma \cdot \vec{G} \cdot \text{CONJ}(\vec{G}) = 2 \cdot \pi \cdot \gamma \cdot \vec{G} \cdot \overline{\vec{G}} \quad (26)$$

Formula (11) becomes:

$$\boxed{\vec{\nabla} \cdot \vec{G} = -4 \cdot \pi \cdot \gamma \cdot (\rho_{re} + i \cdot \rho_{im})} \quad (27)$$

This shows that in nature there are no monopoles of dynamic gravitational field for all speeds less than c , as it is the case with electrostatic and magnetic monopoles.

CASE OF WRONG SIGN IN MAXWELL EQUATION

If we accept that one Maxwell equation has wrong sign as it is suggested in the appropriate article "DERIVATION OF MAXWELL EQUATIONS AND THEIR CORRECTIONS" available on <http://www.andrijar.com/maxwell/maxwell.htm>, than correct Maxwell equations are:

$$\vec{\nabla} \times \vec{E} = \frac{\partial \vec{B}}{\partial t} \quad (28)$$

And:

$$c^2 \cdot \vec{\nabla} \times \vec{B} = \frac{\partial \vec{E}}{\partial t} \quad (29)$$

After the same procedure that is used for derivation of equation (24) is applied on (28) and (29) following formula for complex gravitational field is obtained:

$$\boxed{i \cdot c \cdot \vec{\nabla} \times \vec{G} = \frac{\partial \vec{G}^*}{\partial t}} \quad (30)$$

The difference between equations (24) and (30) is in their right part: equation (30) has its right part conjugated. The conjugation is more acceptable in physical sense because conjugation exists in Poynting formula too, and thus Poynting³ vector has following form:

$$\frac{\partial W}{\partial \vec{S}} = \frac{4 \cdot \pi \cdot \gamma}{c^3} \cdot i \cdot \vec{G} \times \vec{G}^* \quad (31)$$

Where are:

- W = energy,
- $\vec{S}$ = surface,
- γ = gravitational constant,
- c = speed of light,
- i = imaginary unit,
- $\vec{G}$ = complex gravitational field.

ORIGIN OF GRAVITATIONAL FIELD

The basic premise in the article is that the gravitational field has origin in annulations of electrostatic ones. It is based on hypothesis that fields of real poles cannot be annulated – only action that can be achieved is annulations of total force produced by sum of fields from various sources acting to a particular charge.

Further theoretical examination shows that the real origin of gravitational field may have origin in the cinematic energy of rotation because part of potential energy is spent to a work or it is transformed into a radiation quant, i.e. in a photon.

Regarding the Hooper⁴ coil's experiments, we can conclude that those annulated fields can produce secondary effects although their forces are annulated if there exists nontrivial curl solution of the field – and that is just a case with rotating fields. It should be true because the same effect we have in electromagnetic induction in

³ John Poynting, 1852 – 1914.

⁴ W. J. Hooper, U.S. Pat 3610971 & U.S. Pat 3656013, patented in 1972.

electrically neutral conductors: in the area of induction there is no electric field, but there is magnetic field, indeed.

This theory predicts that free charged particles does not have gravitational field. The research done on Stanford University showed that electron in Penning trap is not influenced by the gravitational field at all.

EXPERIMENTAL VERIFICATION

Lets we imagine a device consisted from a red laser, beam splitter and a very tin barrier. If we split the light beam into two ones and than we cross them together at a point on tin barrier we have two situation:

1. When these two beams form maximum at intersection point on the barrier,
2. When these two beams mutually nullify each other on the barrier.

Let we consider the second case. What did happen with energy in the case? Regarding the thermodynamics lows energy cannot be lost and it has to transmute in some other form. If the target, i.e. barrier is thin enough, than the light will simply penetrate trough barrier. How it is possible? At the point of annulations, light as electromagnetic field transmutes into some other energy barely absorbed by barrier. Now it is clear that this other kind of energy is gravitational beam, i.e. that gravitational field is formed from coupled photons.

If we slightly change the energy, i.e. frequency of photons in one beam regarding to the other one (in some non-linear medium in appropriate prismatic object) we can form beam that would have long regions with high intensity of light and than will proceed the region with low intensity of light.

Furthermore if we join these two parallel beams in contra phase we would obtain completely new kind of energy beam. This beam certainly is not a light beam because it is consisted of two annulated light beams and it caring energy of both beams.

Interaction of those two beams in the matter will yield light back, i.e. on the intersection point these beams would temporary decay back into the light.

Regarding the Petrovoltaic⁵ effect organic substances are able to interfere with, I suppose, these beams. We may presume that every organic field has its own absorption gap for the kind of radiation.

Thus with this beams we can perform medical surgery directly at appropriate region inside the body without destructions of tissues on the beams path. Furthermore **Computer Tomography Scanner** based on the beams is able to scan inside any metal body because the beams are resistant to Faraday⁶ shielding.

The telecommunications brings us a completely new band free for usage. Lets we imagine a cellular phone based to the radiation able to dial from the biggest tunnel surrounded with tons of rocks, from the submarine somewhere deep in sea, etc.

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⁵ Petrovoltaic effect is discovered by Prof. Fernando Sanford from Stanford University in 1892.

⁶ Michael Faraday, 1791-1867