STUDYING THE MOVEMENT OF A HORIZONTAL MOVING BODY TAKING INTO ACCOUNT THE RESISTANCE OF THE ENVIRONMENT AND SOLVING RELATED PROBLEMS

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ANNOTATION

This article discusses the causes of the precession movement of the Earth, the precession period, as well as astronomical and climatic changes caused by precessional motion.

Keywords: precession; precessional motion; precession period; angular velocity of precession; deviation from the ecliptic; axis of rotation; ellipsoid; center of mass; gravity; mean value; Polar star; global climatic changes.

GORIZONTAL HARAKATLANAYOTGAN JISMNING HARAKATINI MUHITNING QARSHILIGINI E'TIBORGA OLGAN HOLDA O'RGANISH VA UNGA DOIR MASALALAR YECHISH

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ANNOTATSIYA

Ushbu maqolada Yerning presession harakatining yuzaga kelish sabablari, presession davr hamda presession harakat tufayli yuzaga keladigan astronomik va iqlim o'zgarishlari haqida so'z yuritiladi.

Калит сўзлар: presessiya; presession harakat; presession davr; presession burchak tezlik; ekliptikaga og'malik; aylanish o'qi; ellipsoid; massa markazi; tortishish kuchi; o'rtacha qiymat; qutb yulduzi; global iqlim o'zgarishlari.

Аннотация: В этой статье рассматриваются причины прецессионного движения Земли, период прецессии, а также астрономические и климатические изменения, вызванные прецессионным движением.

Ключевые слова: прецессия; прецессионное движение; период прецессии; угловая скорость прецессии; отклонение от эклиптики; ось вращения; эллипсоид; центр масс; гравитация; среднее значение; Полярная звезда; глобальные климатические изменения.

It is well-known that studying the laws of preservation in the study of physics in pedagogical higher education institutions is of particular importance. Like other preservation laws, the law of impulse moment preservation and the study of various applications are very important not only in the department of mechanics, but also in atomic physics, nuclear physics and quantum mechanics. Therefore, in this article, we will discuss one of the effects associated with the law of impulse moment preservation—the period of presession and prescience of planets. We calculate this in the example of the planet's presession movement and presession period and conclude that in general it is possible to integrate it for the movement of all planets.

To assist individuals desiring to benefit the worldwide work of Jehovah's Witnesses through some form of charitable giving, a brochure entitled Charitable Planning to Benefit Worldwide has been prepared. In other words, the rotation arrow of any rotating body is explained according to the law of impulse moment preservation, creating a presession movement of the effect of the moment of force that wants to change the arrow of this body. Similarly, in addition to orbiting the earth's own axis, the arrow itself moves presession circularly, according to observations. Modern estimates show that the earth's tilt, rotation, and orbit are all only one of our biased and so intertwing. On this topic, we will highlight the cause of the Earth's presession and calculate the presession period.

Let's take a look at how the moment of force that generates the presession movement of the Earth's axis occurs. It is known that the planet Earth is not exactly in the form of a shark, but in the form of an ellipsoid. The centrifular force, which has been affected for millions of years, has enlarged the earth's equator radius. Based on modern calculations, the Earth is equal to the length of the circle passing through the pole and the length of the circle passing through the equator. This is due to the fact that the value of the polar radius is equal to the value of the equator radius and the value of the equator radius is equal to that of the equator radius. We know that the earth's rotation axis forms an angle with a perpendicular conducted on the ecliptic alignment (Figure 2). In the interior of the earth's elliptical, let's distinguish between a shark that is concentrated and equal to a radius. As a result, a layer is formed between the pheasant and the ellipsoid. The thickness of this layer is the maximum in the equator, the value of which decreases to zero, depending on the poles. 39939 593 m

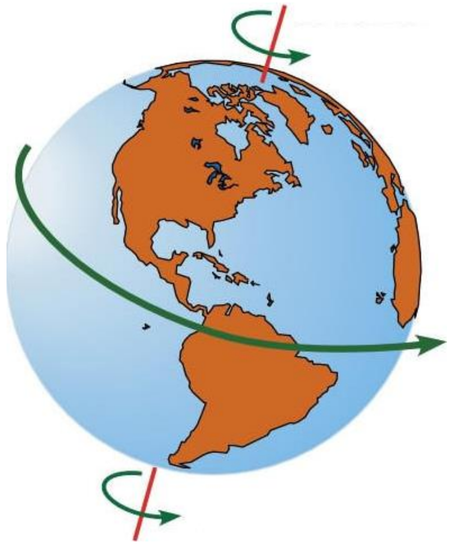

Figure 1

40 075 453 m $\quad R_q = 6356584$ m $\quad R_{ek} = 6378207$ m $\quad \varepsilon = 23^0 27'$ $\quad R_q = 6356584$ m

$\Delta R = R_{ek} - R_q = 21623$ m

Figure 2 depicts the earth's semicircular layers between the ellipsoid and the shark, which are symmetrical to the sun. The mass center of the layer closer to the sun is point *A*, and the mass center of the layer away from the sun is point B. Point A, located closer to the sun, is pulled by the sun by *force* F_1. Also, point B, located far from the sun, is pulled by the sun by force F_2 ($F_2 < F_1$). In addition, the intersections that connect the sun with points A and B do not lie in one straight line (on equal days of autumn and spring, they lie in one line). In other words, points *A* and *B* lie on different sides of the line connecting the Centers of the Earth and the Sun, and due to the sun's pull, they form moments that are not equal to the amount that seeks to turn in the opposite direction relative to the central line. The resulting embryo was allowed to develop in nutrients and then inserted into her womb, where it implanted.

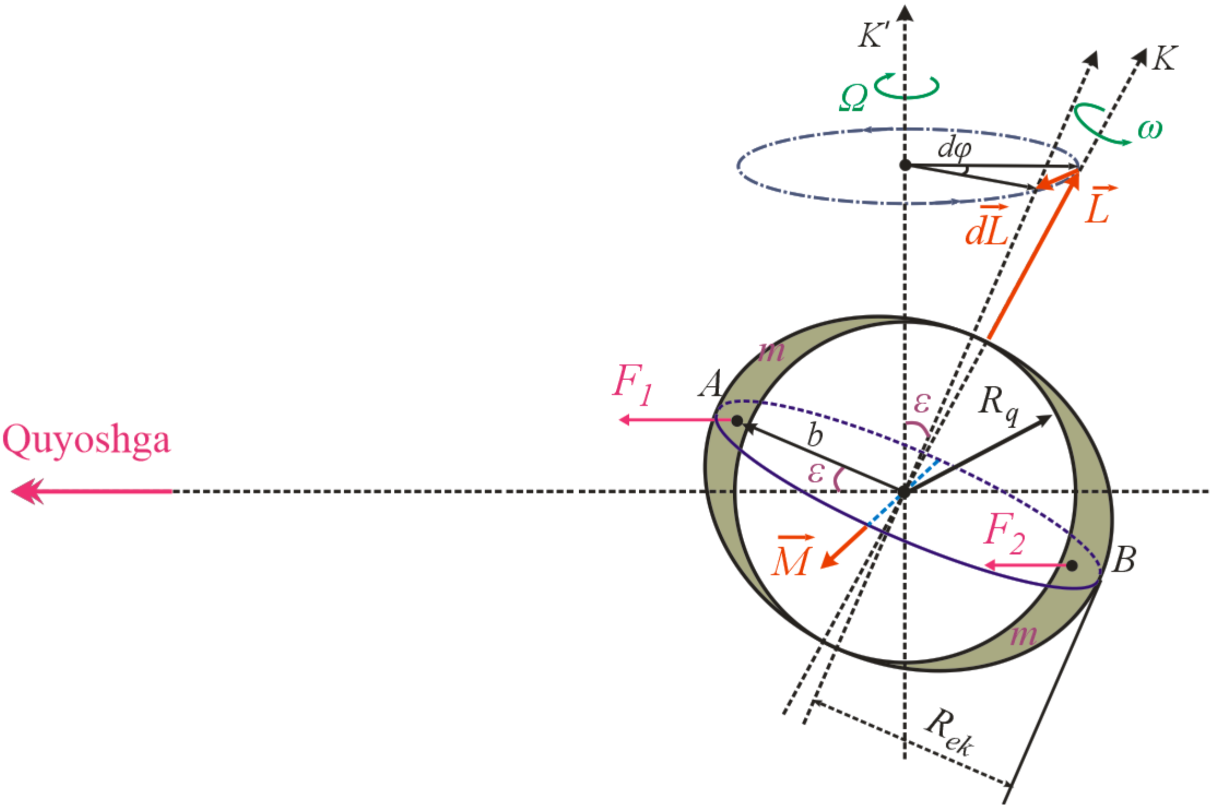

Figure 2

The incomparability of the power moments placed at points A and B (due to the poorness of these power moments) is observed when the Earth's rotation arrow revolves around the *K* arrow, which is perpendicular to the ecliptic alignment . The rotating power moment will be the maximum in summer and winter sun standing, with the autumn and spring equilibriums turning to zero. Thanks to presession, *K* arrow *K* draws a cone with a corner of 46^0 54 around the arrow. *The K* arrow is always a cone-makers, with the Center of the Earth lying at the tip of the cone.

To calculate the presency period, let's take the sun's stay days when rotating moments achieve maximum value. Figure 2 depicts winter in the Shiite hemisphere and summer solstice in the southern hemisphere. The forces of the sun pulling the layers concentrated at point *A* and *B* are as follows:

$$\begin{cases} F_1 = G\dfrac{mM_q}{(r - b\cos\varepsilon)^2} \\ F_2 = G\dfrac{mM_q}{(r + b\cos\varepsilon)^2} \end{cases} \quad (1)$$

Here: – The mass of the sun; – Distance from the center of the Earth to the center of the sun; $M_q = 1{,}99 \cdot 10^{30}$ kg $r \approx 1{,}5 \cdot 10^{11}$ m b is the distance from the center of the earth to point A or *point B*, and if points A or B lie approximately at a depth of between 400 and 500 km from the point on the Earth's equator, the distance *of* b can be considered average; $b \approx R_{ek} - 450\,000 = 5\,928\,207$ m m – The mass of the layer concentrated at point A or B. We will have to do some billing to determine the mass of m.

We calculate the average radius and average density of the Earth.

$$V_{ellip} = V_{o'rt.sfera}, \rightarrow \frac{4}{3}\pi R_{ekv}^2 R_q = \frac{4}{3}\pi R_{Yer}^3, \rightarrow R_{Yer} = \sqrt[3]{R_{ekv}^2 R_q}, \rightarrow$$

$$R_{Yer} = \sqrt[3]{R_{ekv}^2 R_q} = \sqrt[3]{(6378{,}2\,\text{km})^2 \cdot 6356{,}6\,\text{km}} \approx 6371\,\text{km}. \quad (2)$$

$$\rho_{o'rt} = \frac{m_{Yer}}{V_{Yer}} = \frac{m_{Yer}}{\frac{4}{3}\pi R_{Yer}^3} = \frac{5{,}97 \cdot 10^{24}\,\text{kg}}{\frac{4}{3} \cdot 3{,}1416 \cdot (6371000\,\text{m})^3} \approx 5511\,\frac{\text{kg}}{\text{m}^3}. \quad (3)$$

The mass of m is half the mass of the layer between the ellipsoid and the shark.

$$m = \frac{1}{2}\rho_{o'rt}\left(V_{ellips} - V_{shar}\right) = \frac{2}{3}\pi\rho_{o'rt}\left(R_{ekv}^2 R_q - R_q^3\right) = \frac{2}{3} \cdot 3{,}1416 \cdot 5511\frac{\text{kg}}{\text{m}^3} \cdot$$
$$\cdot\left((6378207\,\text{m})^2 \cdot 6356584\,\text{m} - (6356584\,\text{m})^3\right) =$$
$$= 11542{,}24\frac{\text{kg}}{\text{m}^3} \cdot \left(1{,}75 \cdot 10^{18}\text{m}^3\right) = 2{,}02 \cdot 10^{22}\ \text{kg}. \quad (4)$$

Let's calculate the moment of inertia in the milk cycle around the earth's own axis and the moment of impulse.

$$I = \frac{2}{5} m_{Yer} R_{Yer}^2 = 0{,}4 \cdot 5{,}97 \cdot 10^{24}\text{kg} \cdot (6371000\,\text{m})^2 = 9{,}6928 \cdot 10^{37}\ \text{kg} \cdot \text{m}^2 \quad (5)$$

$$L = I\omega = I\frac{2\pi}{T_{Yer}} = 9{,}6928 \cdot 10^{37}\ \text{kg} \cdot \text{m}^2 \cdot \frac{2 \cdot 3{,}1416}{86400\ \text{s}} = 7{,}0488 \cdot 10^{33}\ \frac{\text{kg} \cdot \text{m}^2}{\text{s}} \quad (6)$$

Here: ω – the angle speed around the Earth's own axis; *T=24 hours* is the rotation period of the earth.

The above (1) equation is only appropriate for summer and winter sunstage points. But instead of ε corners in spring and autumn equilibrium,

$$\varepsilon - \frac{\partial \alpha}{\partial t} dt \quad (7)$$

angle should be taken. The reason for this is that when the Earth angles *around the* sun at an angle of 90^0, the forces F_1 and F_2 lie in one line. At the same time, about a month passes. So basically $\frac{365,25}{4} \approx 91,31$

$$\frac{\partial\alpha}{\partial t} = \frac{\pi/2\ rad}{91,31 \cdot 86400\ s} \approx 2 \cdot 10^{-7}\frac{rad}{s} \qquad (8)$$

can be obtained. From *forces* F_1 and F_2 to the center of the Earth, the power shoulder is taken into account. This power shoulder is at the point of winter and summer sunspots

$$a = b\sin\varepsilon \qquad (9a)$$

on equal days in autumn and spring,

$$a=0 \qquad (9b)$$

So so. And at other discretion

$$a = b\sin\left(\varepsilon - \frac{\partial\alpha}{\partial t}dt\right) \qquad (9c)$$

will be equal to . The resulting power moment caused by F_1 and F_2 forces

$$\Delta M = (F_1 - F_2)a$$

will be equal to . This power moment is for summer and winter sun standing points

$$\Delta M = (F_1 - F_2)a = GmM_q\left(\frac{1}{(r - b\cos\varepsilon)^2} - \frac{1}{(r + b\cos\varepsilon)^2}\right)b\sin\varepsilon \qquad (10a)$$

on equal days in autumn and spring,

$$\Delta M = 0 \qquad (10b)$$

will be equal to . And at other discretion

$$\Delta M = GmM_q\left(\frac{1}{\left(r - b\cos\left(\varepsilon - \frac{\partial\alpha}{\partial t}dt\right)\right)^2} - \frac{1}{\left(r + b\cos\left(\varepsilon - \frac{\partial\alpha}{\partial t}dt\right)\right)^2}\right)b\sin\left(\varepsilon - \frac{\partial\alpha}{\partial t}dt\right) \qquad (10c)$$

will be equal to . The above formula shows that the ΔM power moment is variable over time. Therefore, this moment would have a different value of 365 different types of values on 365 day of the year. This makes the billing work extremely complicated. Because, for 1 year, the angle

$$-\varepsilon \le \varepsilon - \frac{\partial\alpha}{\partial t}dt \le \varepsilon \quad \text{or} \quad 0 \le \left|\varepsilon - \frac{\partial\alpha}{\partial t}dt\right| \le \varepsilon \qquad (11)$$

varies in the interval. Of course, accordingly (22.10c) the values and values of those who participated in the formula vary. These $\sin\left(\varepsilon - \frac{\partial\alpha}{\partial t}dt\right)$ $\sin\left(\varepsilon - \frac{\partial\alpha}{\partial t}dt\right)$ trigonometric iifodas [0; ε] we need to determine the average value of the interval.

$$\begin{cases} \overline{\sin(x)} = \overline{\sin\left(\varepsilon - \frac{\partial \alpha}{\partial t} dt\right)} = \frac{\int_0^{\varepsilon} \sin(x)}{\varepsilon - 0} = \frac{1-\cos(\varepsilon)}{\varepsilon} = 0{,}19342 \\ \overline{\cos(x)} = \overline{\cos\left(\varepsilon - \frac{\partial \alpha}{\partial t} dt\right)} = \frac{\int_0^{\varepsilon} \cos(x)}{\varepsilon - 0} = \frac{\sin(\varepsilon)}{\varepsilon} = 0{,}97461 \end{cases} \quad (12)$$

Now (22.10c) we determine the moment of power that creates a presessional circular motion by placing a trigonometric averaged value in the formula.

$$\Delta M = GmM_q b\overline{\sin(x)}\left(\frac{1}{\left(r - b\,\overline{\cos(x)}\right)^2} - \frac{1}{\left(r + b\,\overline{\cos(x)}\right)^2}\right) =$$

$$= 6{,}67 \cdot 10^{-11} \frac{N \cdot m^2}{kg^2} \cdot 2{,}02 \cdot 10^{22}\ kg \cdot 1{,}99 \cdot 10^{30} kg \cdot 5{,}928 \cdot 10^6 m \cdot 0{,}19342 \cdot \quad (13)$$

$$\cdot\left(\frac{1}{\left(1{,}5 \cdot 10^{11} m - 5{,}928 \cdot 10^6 m \cdot 0{,}97461\right)^2} - \frac{1}{\left(1{,}5 \cdot 10^{11} m + 5{,}928 \cdot 10^6 m \cdot 0{,}97461\right)^2}\right) =$$

$$= 3{,}0754 \cdot 10^{48} N \cdot m^3 \cdot 6{,}8476 \cdot 10^{-27}\ m^{-2} = 2{,}10346 \cdot 10^{22}\ N \cdot m$$

We can calculate the presession angle speed, assuming the above-mentioned power moment has a continuous uniform effect.

$$d\varphi = \frac{dL}{L\sin\varepsilon} = \frac{\Delta M\, dt}{L\sin\varepsilon}, \quad \rightarrow \quad \Omega = \frac{d\varphi}{dt} = \frac{\Delta M}{L\sin\varepsilon} \quad (14)$$

$$\Omega_{pr} = \frac{\Delta \mathrm{M}}{\mathrm{L}\sin\varepsilon} = \frac{2{,}10346 \cdot 10^{22}\ \mathrm{N \cdot m}}{7{,}0488 \cdot 10^{33} \frac{\mathrm{kg \cdot m^2}}{\mathrm{s}} \cdot \sin 23{,}45^0} = 7{,}8144 \cdot 10^{-12} \frac{\mathrm{rad}}{\mathrm{s}} \quad (15)$$

In this presession davrni topamiz.

$$\mathrm{T_{pr}} = \frac{2\pi}{\Omega} = \frac{2 \cdot 3{,}1416}{7{,}8144 \cdot 10^{-12} \frac{\mathrm{rad}}{\mathrm{s}}} = 8{,}04055 \cdot 10^{11}\ \mathrm{s} = 9\ 306\ 196\ \mathrm{sutka} \approx 25\ 479\ \mathrm{yil} \quad (16)$$

In the above expression (16), we formed a value of 25,479 years ≈ T pr of the presession period for the Earth. In fact, it is estimated that the period was 25,800 years. There are about 1,6% errors here. The following reasons can be cited:

- the average value of trigonamertic expressions was used, not the value of every ten;
- It was taken as the distance between the Earth and the sun. In fact, The Earth's orbit is elliptical without a circle and varies between the distance between the sun and the Earth;

$$\mathrm{r} = 1{,}5 \cdot 10^{11}\ \mathrm{m}\ \ 1{,}47 \cdot 10^{11}\ \mathrm{m} \le \mathrm{r} \le 1{,}52 \cdot 10^{11}\ \mathrm{m}$$

- The earth's natural satellite, the moon's movement, is also likely to affect the process in small quantities.

Due to prescience , the direction of the K-axis in the phase changes. As a result, seasons are observed moving along the solar calendar. After 12,900 years, theK arrow k will be changed to 180 0 throughout the cone, resulting in mid-Winter June 22 and December 22 in mid-summer. The resulting embryo was allowed to and then inserted into her womb, where it implanted. As a result, in 71 years, spring and autumn equilibriums and winter and summer sun standings increase by 1 month on the calendar. The equations then shift to March 22 and September 23, the longest day to June 23, and the shortest day to December 23. Without the artificial environment of the freezer, the embryos would soon deteriorate to the point of no deteriorate to the point of no deterioration.

Due to presession, the polar star is also gradually changing due to the earth's axis moving along the cone citrus. Currently, the star we call a polar star will not become a polar star after 1000 to 2000. The earth's rotation axis will be directed towards another star, and future generations will call that star a polar star. For example, it is halfway through the same presessia period, that is, after 12900, the Earth's rotating arrow will be directed toward the Vega star. The night viscera movement of skylights takes place around this Vega star. Therefore, after 12900, the Vega star becomes the next polar star (Figure 3).

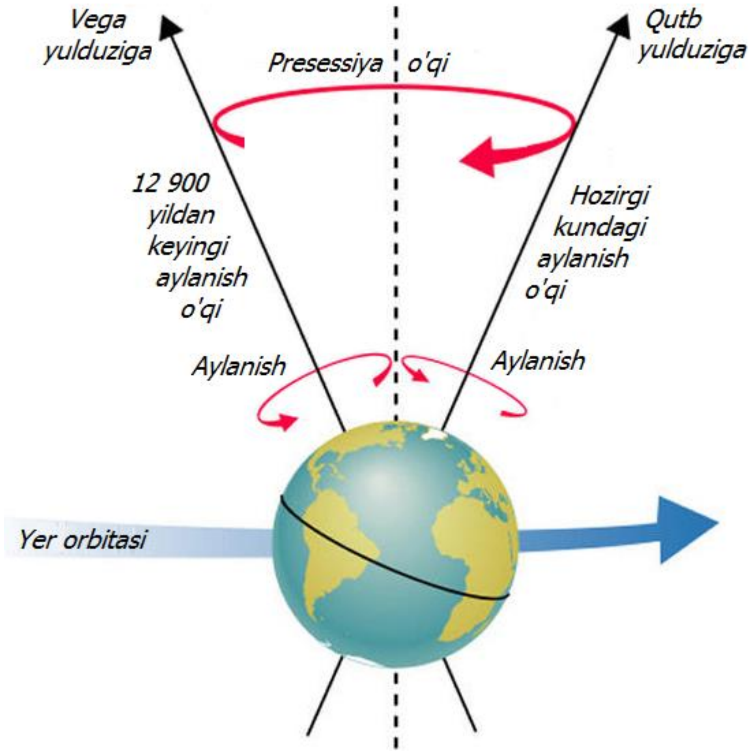

Figure 3

One of the most important natural events caused by the presession movement of the Earth's axis is the global climate change event. One of the main reasons for the emergence of the global glacier period or global warming period is the level of activity that occurs in the sun on the one hand, while another reason is the presessional circular movement of the Earth's axis. Physics-reading students know that Earth's orbit is not exactly in the form of a circle, but has an elliptical shape. During the movement of the earth along its orbit, the distance from the sun varies from 147.1 to 152.1 million km. These points are known in Astronomy as "Perigey" and "Apogey". When the earth's planet is in Perigey and apogey points, the light energy that falls on its surface is 1,069 times different. It also depends on the angle cosinu when the sun's rays fall at an angle. If the summer sunrise corresponds to the Perigey point, and the winter Sunrise to the Apogee point, then summer will be very hot and winter warm. In this way, the planet Earth will be experiencing a period of global warming. Likewise, if the summer Sunrise stays right to the Apogey point, and the winter Sunspot coincides with the Perigey point, then summer will be cool, and winter will be very cold. At the same time, the planet Earth will be experiencing a global glacial period.

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So, the most important effect associated with the law of impulse moment preservation is the presession effect, which is why what process is in the Earth's surface arrow

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