

## TO THE QUESTION OF DEVIATION OF MAIN AXIS OF INERTIA ELLIPSOID OF THE MOON FROM DIRECTION TO EARTH.

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### Introduction:

From observations it is known that the center of mass of the Moon does not coincide with the geometric center of its figure, and the line connecting these two centers is not directly on the center of the Earth and deviates to the South-East. This paper investigates and explains the effect of steady-deviation of principal axis of inertia ellipsoid of the Moon to the South from the direction to the Earth. To this end, we studied the physical libration of the moon in latitude.

We consider a system of five linear differential equations obtained by the new vector method and taking into account the perturbations from the Earth [1,2]. Obtained the characteristic equation for this system and found all five frequencies. Special attention is paid on the fifth (zero) frequency for which the solution of the equations of libration in latitude is stationary and represents a previously unknown additional motion to the axis of rotation of the Moon through the cone with small cone angle.

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It is important that the mechanism of quasi-precession is associated with a fixed tilt to the South (for an observer on the Earth) of the main axis of the ellipsoid of inertia of the Moon. In contrast to the astronomical precession of the Earth, here the angular velocity vector rotates about the cone in the positive (counterclockwise) direction with a period. On the basis of this phenomenon is called as quasi-precession. The mechanism of quasi-precession leads to the stationary tilt of the main axis of the ellipsoid of inertia of the Moon to the South (for an observer on the Earth), that helps to explain one

of the observed variance of the center of mass of the moon from the direction to the Earth. By this method, taking into account known from observations of the axis offset to the South, we find that the angle of the solution cone of quasi-precession approximately equal 0.834 arcsec.

### References:

- [1] B.P. Kondratyev. (2011) SoSyr, 45, 60-74.
- [2] B.P. Kondratyev. (2011) SoSyr, 45, 447-458.