THE MEAN POLE OF THE MOON'S ROTATIONAL AXIS AND GENERAL SELENOCENTRIC COORDINATE SYSTEM

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One of the fundamental problems of lunar astronomy is the reduction of the coordinates of the Moon's surface, found by astronomical methods, to its mean pole. The instantaneous poles of the rotation axis and the instantaneous equator move in the Moon's body. The unstable position of this equator does not allow one to use in selenodesy the instantaneous spherical coordinates which have not been preliminarily transformed into some unified system of coordinates. Such a reduction can be made to the system of coordinates connected with the mean pole—to be definite, we shall speak about the Moon's North pole.

According to theoretical studies [1], it can be asserted that owing to the resonant character of the Moon's rotational motion, the influence of various perturbing factors (in the first case, the influence of the third and higher harmonics of the Moon's force function), the Moon's mean pole is displaced with respect to the poles of the polar axis of inertia mainly in the plane of the zero meridian by the angle 74".72 away from the Earth and by the small angle 0".025 eastward. However, it should be noted that the displacements are to a considerable degree dependent upon the choice of a model of the Moon's gravitational field.

The Earth and Moon theories of rotation for nonprincipal axes of inertia can be applied to the solution of numerous direct and inverse problems of the Earth-Moon system: geodynamics, geophysics, and physics; in particular forr the determination of the main geocentric and selenocentric systems of coordinates, *e.g.* for the determination of the principal central axes of inertia of the mean poles of the Earth and the Moon. If precice enough observational data are available, the theories allow also to solve problemes of determination of the parameters of the Moon's gravitational field and of various parameters of its rotation.

References

[1] Barkin, Yu.V.: 1989, "Dynamics of a system of non-spherical celestial bodies and the theory of the Moon's rotation", PhD Thesis Sternberg Astronomical Institute, Moscow State University, 412 pp.

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