Oscillations of poles under action of gravitational-tidal perturbations for model of the deformable Earth

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Precision data of experimental observations over trajectories of motion of poles of vector of angular velocity of the Earth rotation testify about rather complex dynamic processes occuring in the Earth-Moon-Sun system. Development of the adequate mathematical model, allowing to describe real trajectories of an instant axis of rotation in the system of coordinates connected with the Earth, it is obviously important in astrometric and geophysical aspects.

For the description of rotary motion of the deformable Earth and oscillatory motion of its poles the mechanical model of a viscoelastic rigid body based on strict theorems of theoretical mechanics and methods of perturbations - singular developments and averaging has been used. It was supposed, that process of deformation occurs quazistatically.

For research of the established motions the problem of dynamics and the analysis of an opportunity of rapproachement of an axis of the greatest moment of inertia of the Earth with a vector of the kinetic momentum have essential value. In the scientific plan it is rather interesting to reveal the mechanisms of the external influence interfering such rapproachement and leading to established oscillations on intervals of time of the order of the period of precession.

In the work by means of asymptotic methods of nonlinear mechanics and mathematical modelling of the equations of motion in variables angle-action by authors the qualitative analysis and quantitative estimations of the false dynamic process describing a relative positioning of an instant axis of rotation of the Earth, an axis of a figure and its vector of the kinetic momentum are given. Opportunities of identification and of approximate analytical model to real trajectories measurements of oscillatory motion of a pole are studied.