15th INTERNATIONAL CONFERENCE
Dynamical Systems — Theory and Applications
December 2-5, 2019. Lodz, POLAND.

DSTA 2019

paper id: MAT84

On the theory of wave gravitational field arising under orbital motion of a gravitating body

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Abstract: This work investigates wave processes in orbital motion of a body under its gravitational interaction with a central body based on the statistical theory as well as the theory of retarded gravitational potentials. The statistical theory for a cosmogonical body forming (so-called spheroidal body) has been proposed in our previous works. It predicts statistical oscillations of orbital motion of planets around stars. Indeed, as known, the Alfvén–Arrhenius's radial and axial oscillations modify the forms of planetary orbits. Here we explain how the stability of orbital body (a planet) moving around central gravitating body (a star) is reached by the wave gravitational interaction between them. Using the statistical theory of cosmogonical body formation we find that periodic temporal deviation of the gravitational compression function of a spherically symmetric spheroidal body (under the condition of mechanical quasi-equilibrium) induces an additional periodic force of Alfvén–Arrhenius. Within framework of the developed theory of retarded gravitational potentials the formula of additional periodic force (as well as the wave gravitational potential relation) is also derived. We show that energetic wave exchanges between the central gravitating body and the orbital moving body seem be effected in the different spectral domains. Therefore, the orbital motion of body should be considered in a fast oscillating wave gravitational field.

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