On the stability of periodic motions of an axisymmetric satellite-gyrostat in a circular orbit

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In the paper, we investigate the stability of periodic motions of axially symmetric satellite-gyrostat. The center of mass of the satellite moves in a circular Keplerian orbit, in the equations of motion of the satellite relative to the center of mass we take into account only the gravitational moment; as variables we use Andoyer modification of variables. The equations of motion of the problem admit Jacobi integral, through which the lowering of the order of two units and the equations are reproduced in the form of so-called Whittaker. Poincaré method is used to prove the existence of multi-parameter families of periodic solutions of the reduced system and periodic solution are generated.

Keywords: *stability, characteristic exponents, satellite-gyrostat, Andoyer variables, the gravitational moment, Poincaré method, periodic and conditionally periodic motion.*

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