Numerical analysis of periodic motions of a dynamically symmetric satellite originated from its hyperboloidal precession

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The article presents families of periodic satellite movements originated from its hyperboloidal precession as a special case of a dynamically symmetric satellite — solid body motion about the center of mass in a circular orbit. The parameters of the family are total mechanical energy deviation from its value on the hyperboloidal precession and the ratio of the polar and equatorial moments of inertia of the satellite (inertial parameter).When energy values are close to the value in the hyperboloidal precession, periodic motions are obtained by Lyapunov technique as convergent series. For arbitrary values of energy for obtaining periodic motions numerical parameter continuation method for solution families proposed by A.G. Sokolskiy and S.R. Karimov was applied. The research techniques are described briefly, recommendations on the selecting the parameter increments are set out, the results of constructing a family of periodic motions originated from satellite hyperboloidal precession are presented.

Keywords: *hamiltonian mechanics, numerical methods, periodic motions, symmetric satellite, hyperboloidal precession.*

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