

MATHEMATICAL MODEL OF END BODY DYNAMICS IN MOTION OF SPACE TETHER SYSTEM STABILIZED BY ROTATION

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Examining the effects of the end body dynamics on the system motion holds a significance in understanding the dynamics of the space tether systems (STS) stabilized by rotation. The study purpose is to build a mathematical model of the STS dynamics for considering the general regularities of the system motion and to analyze comprehensively the special features of the end body dynamics. The simplest model of the STS dynamics consisting of the material point and the end body connected by a tether is proposed for the motion under consideration. This model can analyze the angular oscillation of the end body relative to the tether attachment point, taking into account the effects of the inertial characteristics of the end body, the tether stiffness and the angular velocity of the proper rotation of the system. Practical problems related with the problem of the STS dynamics may include the problems of the stability of the end body orientation, resonance modes in the system motion, as well as the problems in creating the prerequisites for the design of the specific STS.

Keywords: *space tether systems, mathematical model, rotation stabilization, end bodies, transient conditions.*

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