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Space Elevator Critical Technology Verification and Validation Testing (3)

Author: Prof. Alexander Burov

A.A.Dorodnicyn Computing Centre, FRC Computer Science and Control, Russian Academy of Sciences &  
Higher School of Economics, Russian Federation, teormech@gmail.com

Prof. Anna Guerman

Centre for Mechanical and Aerospace Science and Technologies (C-MAST), Portugal, anna@ubi.pt

Prof. Ivan Kosenko

A.A.Dorodnicyn Computing Centre, FRC Computer Science and Control, Russian Academy of Sciences,  
Russian Federation, kosenko@ccas.ru

Dr. Vasily Nikonov

FRC Computer science and control, Russian Academy of Sciences, Russian Federation, nikon\_v@list.ru

SPACE ELEVATOR OPERATION IN PROXIMITY OF ASTEROIDS

**Abstract**

Weak irregular gravitational field of an asteroid and fairly large centrifugal force represent serious difficulties for spacecraft operations in a vicinity of asteroid. One of possible solutions to the problem could be placing the spacecraft near the asteroid and connecting it to the surface by tethers, making use of several advantages that space elevators provide. In present paper, the relative equilibria of such elevator are considered in the framework of rather simple model. We study spacecraft attached to the surface of a uniformly rotating celestial object via an extensible tether. The domains, where the spacecraft can be held using such structure, are described. Stability of the found relative equilibria is studied as well as the influence of the elastic force to equilibrium configurations. The results are illustrated considering particular case of a body with spherical mass distribution