

LONG TIME MISSIONS AND THE FUEL-OPTIMAL ATTITUDE MANEUVERING IN A SWINGING MODE

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The problem of fuel-optimal attitude maneuvering with non-fixed time is considered. The state constraint related to the maintenance of the artificial gravitation is imposed. This problem is especially important for the long-time space missions. The attitude of the space vehicle is controlled by means of a pair of reactive engines which produce a single control torque with fixed direction in the body-fixed frame. An optimal solution is obtained in the class of trajectories belonging to "swinging mode" two-periodic sliding cycling regimes. The solution is found in analytical form and optimal synthesis is obtained. The HJB equation is solved analytically.

¹This is a joint work with Michael Borshchevsky and Per-Olof Gutman.