

Entering into Space and New Energy and Propulsion Technology (7)
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SIMPLE GUIDANCE SCHEME FOR LOW-THRUST GEOSTATIONARY ORBIT TRANSFERS

Abstract

A simple guidance scheme is developed for minimum-time low-thrust orbit transfer from GTO to GEO, to facilitate the onboard computation and attitude maneuver. To guarantee the attitude stability, the guidance law is fixed in one orbital period: the control component in the orbital plane is chosen between semi-major axis optimal and eccentricity optimal, and the magnitude of out of plane control component is depend on the ratio relation between the inclination and eccentricity. An analytic averaging technique is employed to propagate the classical orbital elements changes in one orbital period, involving control thrusting, earth J2, third-body perturbations and shadow effects. At last, numerical results of low-thrust geostationary orbit transfers using simple guidance scheme are presented.