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RESEARCH ON GEO SATELLITE RESIDUAL PROPELLANT ESTIMATION USING SOLAR RADIATION METHOD

Abstract

Residual propellant estimation is an important issue for GEO satellite on-board management because it actually represents the left lifetime and implies the critical information for satellite de-orbiting. Satellite residual propellant is the only factor causing the variation of its mass-area ratio which is one of satellite body attributes. This attribute together with satellite surface reflectivity decides how the solar radiation perturbation affects satellite orbit. Solar radiation perturbation is related to Sun direction,satellite mass-area ratio, satellite surface reflectivity and satellite form, but has nothing to do with the longitude of GEO satellite. Because of the POD theories and methods have acquired enough progress, and observing measures have reached a high level,there is a presumption that we can get some information of satellit mass from it precise orbit. In this paper we first give the analytical course of estimating the residual propellant through solar radiation method, and then we present and example to account for the feasibility of this method. Based on these work, the conditions to be satisfied to apply this method to engineering have been suggested in the last of this paper.