



Optimal Longitudes Determination for the Station Keeping for Areostationary Satellites

Pilar Romero (1) and Juan Jose Silva (2)

(1) Dep. Astronomía y Geodesia, Facultad de Ciencias Matemáticas, Universidad Complutense de Madrid, Madrid, Spain (prp@mat.ucm.es)., (2) Dep. Matemática Aplicada, Facultad de Ciencias Matemáticas, Universidad Complutense de Madrid, Madrid, Spain (juanjo.silva@neo-metrics.com).

An areostationary orbit is an ideal situation in which Mars is supposed to be spherical and homogeneous and the external forces such as the attraction of the sun or the solar radiation pressure are not considered. However, natural perturbations tend to shift an areostationary satellite from its nominal station point. Hence orbital manoeuvres are necessary to keep the satellite within a predefined box over one place on Mars.

We present the optimal longitudes for the station keeping of an areostationary satellite taking into account the Martian gravitational field perturbations. Firstly, using an analytical model, optimal longitudes are estimated. Besides, the permanence time and the tangential acceleration are obtained. Secondly, with a numerical method, optimal longitudes are improved. The computation shows the precise localization of two stable and unstable points for an areostationary satellite.