

SPACE DEBRIS SYMPOSIUM (A6)

Poster Session (P)

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KINETIC CHARACTERISTICS OF SATELLITES IN TETHER DRAG DEORBITING

Abstract

The tether drag deorbit technology is a new concept for an abandoned satellite removal, in which a based satellite is linked with an abandoned satellite by a tether, constituting a tethered system; then the abandoned satellite is transferred and towed into a parking or graveyard orbit. This technology is an effective method for space environment maintenance. In tether drag deorbiting, attitude motion of abandoned satellite, pendular motion and orbital change of tethered system will affects flight safety and arouses instability, such as tether winding or collision between satellites. In this paper, based on the model of tether drag deorbit system, the kinetic characteristics of satellites, such as pendular motion, rotation and nutation, are studied on the basis of numerical simulation; moreover, the coupling relationship between kinetic characteristics of satellites and orbital dynamics of tethered system is analyzed; afterwards, a tension based control method is proposed to damp out the attitude motion of satellites.