66th International Astronautical Congress 2015

SPACE DEBRIS SYMPOSIUM (A6)
Interactive Presentations (IP)

Author: Prof.Dr. Antonio Delson Jesus
Brazilian Space Agency (AEB), Brazil, a1d1j1@gmail.com

Mr. Rafael Sousa Ribeiro
Universidade Estadual de Feira de Santana, Brazil, rafanw72@gmail.com
Dr. Ernesto Vieira Neto
UNESP - Univ Estadual Paulista, Brazil, ernesto@feg.unesp.br

EVASIVE MANEUVERS PULSED IN SPACE DEBRIS ENVIRONMENT, SUBJECT TO DISTURBANCES OF ATMOSPHERIC DRAG AND TECHNOLOGICAL PARAMETERS.

Abstract

We study the problem of the viability of space missions in space debris environment around the Earth. The study established evasive maneuvers that are implemented through a propulsion system whose efficiency was measured by technological parameters, and that these can be configured in the planning of the mission. For these maneuvers, we consider the propulsion force as a disturbance to the motion of the satellite, such that its nominal orbit is maintained. The evasive maneuvers were studied to be applied so that occur without escape of its nominal orbit and for this purpose we treat the thrust as a disturbance to the movement of the satellite. The propulsive arch to the evasive maneuver is semi-continuous, active during a time pulse, such that the technological parameters of the propulsion system controls the angular velocity of the satellite. Our results show that the use of pulsed time allows greater efficiency in the operation of evasive maneuvers, because it is shorter than the operating time. Similarly, we have included in the trajectory the atmospheric drag as a disturbance to the motion. With the optimization method known as "Particle Swarm Optimization" we find the collision possibilities and the most economical evasive maneuvers and without high computational cost.