

Quasi-Impulsive Maneuvers to Correct Mean Orbital Elements in LEO

An approach is developed to compute quasi-impulsive maneuvers to steer the orbital elements of a spacecraft to a desired value. Using Gauss Variational Equations it is possible to define the location along the orbit as well as the magnitude of the maneuver(s) so that specific orbital elements can be changed with little influence on the others. The possibility to include the effect of the zonal terms of the gravity model of the Earth and of the atmospheric drag allows an accurate evaluation of the time required to reach the maneuvering location. Including a model of the propulsion system makes the simulation more realistic, if compared with an impulsive maneuver implementation, since a burning arc can replace the instantaneous change of the orbital elements, which is instead associated with the impulsive approach. Simulations have been performed to compare perturbed and unperturbed cases and the results from the comparisons are presented.