

Orbital Maneuvers with Minimum Consumption for a Spacecraft Orbiting the Earth

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Abstract

The present research performs numerical studies to search for the best maneuvers, from the point of view of minimum fuel consumption, to modify the orbit of a spacecraft around the Earth. For those maneuvers, low thrust propulsion is used and optimal and sub-optimal maneuvers are considered. In this way, a continuous low thrust is applied to the spacecraft with a fixed magnitude and the control is based on choosing the direction of the propulsion and the instants of turning it on and off. Optimal control gives the best parameters, while sub-optimal control restricted the control to follow a pre-described function. The present research will compare those results.

Keywords: Astrodynamics, Orbital maneuvers, Optimal control, Suboptimal control.