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Bi-Impulsive Control to Build a Satellite Constellation*

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Abstract: This paper considers the problem of optimal maneuvers to insert a satellite in a constellation. The main idea is to assume that a satellite constellation is given, with all the Keplerian elements of the satellite members having known values. Then, it is necessary to maneuver a new satellite from a parking orbit until its position in the constellation. The control available to perform this maneuver is the application of two impulses (instantaneous change in the velocity of the spacecraft) to the satellite and the objective is to perform this maneuver with minimum fuel consumption. The maneuver that changes the angular position of a satellite keeping all the other Keplerian elements constant is also considered.

Keywords: *Orbital maneuver; astrodynamics; impulsive control; satellite constelation.*

Mathematics Subject Classification (2000): 70F15, 70M20, 93C99.