Closed Loop Control System Applied to Transfer Maneuvers Using Continuous Thrust

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Abstract

This work considers the problem of controlling the trajectory during orbital transfer maneuvers, using a propulsive system capable of applying continuous thrust for a long period of time. Some non-ideality of the thrusters and their effects on the control system during the transfer orbit were analyzed. It was considered a control system in closed loop and low-thrust propulsion with high specific impulse. Through some simulations, it was possible to analyzed the deviation in the trajectory and evaluate the control system. Two cases were considered: velocity increment applied tangentially to the trajectory, with and without errors in the propulsion system. Therefore, a gradual increase of the semi-major axis was obtained. To validate the simulator, the results were compared with the literature. The results showed that the use of continuous thrust might present advantages for some space missions. It was also confirmed the requirement of a closed loop control system for these missions.

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