

Optimal Transfer Orbits for Satellite Formation Flying Applications

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ABSTRACT

This dissertation focused on trajectory optimization problems arising from the application of satellite formation flying, and obtained three major results. First, the dissertation proposed an algorithm for finding a multi-impulse, fuel-optimal trajectory, based on relative motion dynamics, and the necessary conditions from the Pontryagin Maximal Principle. Second, the dissertation derived sufficient conditions, verifying the optimality of the impulsive trajectories obtained in the first part. Third, the dissertation presented an analytic linearization method, termed the “primer vector approximation method,” for solving nonlinear continuous-thrust trajectory optimization problems..