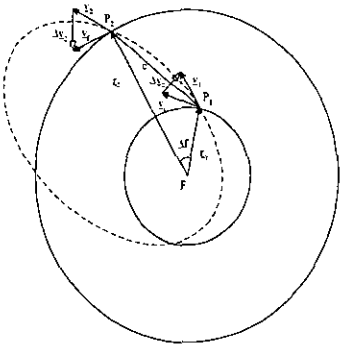
Minimum Fuel and Time Satellite Maneuver Using Lambert Theorem

Chang-Hee Won
Electronics and Telecommunications Research Institute

A typical application of Lamberts theorem is to determine the transfer orbit from the connecting two position vectors and the transfer time. It is possible, however, to perform the optimal fuel and time transfer using this Lamberts theorem. In this paper we formulate the transfer time and delta velocity equations using Lamberts theorem. Then we derive the minimum time transfer condition for the two impulse circle-to-circle transfer. The necessary and sufficient conditions are also derived for minimum fuel transfer when the transfer angle is anywhere between zero and three hundred sixty degrees. Furthermore, we show that the Hohmann transfer is the minimum fuel two impulse solution when the transfer angle is one hundred and eighty degrees. An algorithm to perform minimum fuel and time two impulsive orbital transfer is derived using Lamberts theorem.



Orbit Maneuver