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SPACE EXPLORATION SYMPOSIUM (A3)
Solar System Exploration (5)

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NAVIGATION SYSTEM FORMED BY SPACECRAFT LOCATED AT THE EARTH-MOON LIBRATION POINTS

Abstract

The Very Long Baseline Interferomety (VLBI) techniques are usually utilized to track the explorers with high accuracy in deep space missions. The large separation distance of libration points L3, L4 and L5 of the Earth Moon System would be employed to establish a long baseline interferometry tracking and navigation system in order to avoid serious adverse effects of the Earth's troposphere and ionosphere on signal transitions. Spacecrafts located at these points form a triangle system with three extremely long baselines about 660000km and should be better performed than any ground VLBI system if the orbit determination and control are well implemented.

However, both of the two triangular libration points L4, L5 of the Earth Moon system are not stable from the dynamics point of view due to the obvious perturbation of the solar gravity. This paper studies the theories to form a quasi-periodic orbit around the triangular points and different control strategies to ensure a stable and viable navigation system. The result demonstrates the feasibility of the constellation navigation system and figures out the cost to realize it.