

THE ROLE OF INVARIANT MANIFOLDS IN LOW THRUST TRAJECTORY DESIGN

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An initial study of techniques to be used in understanding how invariant manifolds are involved in low thrust trajectory design for the Jovian moon missions was performed using a baseline trajectory from the Europa Orbiter (EO) studies. Poincaré sections were used in order to search for unstable resonant orbits. The unstable manifolds of these resonant orbits were computed, and they were found to provide an indication of how the EO trajectory was able to transition between resonances. A comparison with the stable and unstable manifolds of Lissajous orbits around the Jupiter-Europa L_2 Lagrange point provided evidence that the Europa capture utilizes invariant manifolds of quasi-periodic orbits.

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