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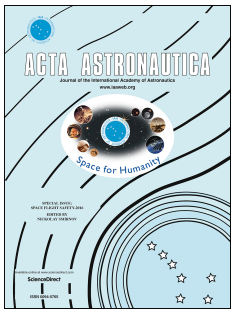

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TRAJECTORY DESIGN FOR A CISLUNAR CUBESAT LEVERAGING DYNAMICAL SYSTEMS TECHNIQUES: THE LUNAR ICECUBE MISSION☆

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Abstract

Lunar IceCube is a 6U CubeSat that is designed to detect and observe lunar volatiles from a highly inclined orbit. This spacecraft, equipped with a low-thrust engine, is expected to be deployed from the upcoming Exploration Mission-1 vehicle. However, significant uncertainty in the deployment conditions for secondary payloads impacts both the availability and geometry of transfers that deliver the spacecraft to the lunar vicinity. A framework that leverages dynamical systems techniques is applied to a recently updated set of deployment conditions and spacecraft parameter values for the Lunar IceCube mission, demonstrating the capability for rapid trajectory design.

Keywords: Trajectory design, CubeSats, Small satellites, Multi-body dynamics, Dynamical systems theory

1. Introduction

With the emergence and increased development of miniaturized satellite technologies, CubeSats offer an alternative platform for unmanned exploration

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