

ASTRODYNAMICS SYMPOSIUM (C1)
Orbital Dynamics - Part 1 (3)

Author: Dr. Dong Qiao
Beijing Institute of Technology, China, qiaodong@bit.edu.cn

Prof. Pingyuan Cui
Beijing Institute of Technology, China, cui@astro.hit.edu.cn

Dr. Rui Xu
Beijing Institute of Technology, China, xurui@bit.edu.cn

MARS-PHOBOS LOW ENERGY TRANSFER IN THE RESTRICTED THREE BODY PROBLEM

Abstract

Low energy interplanetary transfers have been widely studied in the last twenty years. These kinds of transfers roused interest in designing lunar trajectories. In design of transfer trajectories, the particular space regions, called Weak Stability Boundaries (WSB), was used. The WSB transfer has been applied successfully in saving the Japanese lunar satellite Hiten. In this paper, it deals with the structure of the phobos weak Stability boundaries in the framework of the restricted three body problem. The configuration of the stable and unstable regions in planar cases is investigated. Stable regions will use to design low-energy transfer. The definition and characteristics of the weak stability boundaries in terms of capture conditions is analyzed. Then geometry and properties of the escape trajectories is studied by changing the spacecraft orbital parameters around the phobos. Weak stability boundaries geometry permitted us to modify the design of the low energy capture trajectories in order to reach stable capture. Finally, the Mars-phobos low energy transfer trajectories in real-word system are design