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PLANET GRAVITY ASSIST OF CONTINUOUS PROPULSION SPACECRAFT

Abstract

At the long distance deep space mission, recently continuous propulsion is adapted by new method of spacecraft propulsion system. At the same time, proper outer planet's gravity assistant can be considerable for effective mission operating. Planet's gravity assistant process is considered as method of velocity direction changing and obtaining velocity increasing. Continuous propulsion reduce mission operating time to reach target planet. And also, target planet's gravity assistant give additional possibility of more beyond long distance deep space mission above solar system. Although the most ideal case is that spacecraft reach to target planet by continuous propulsion and after spacecraft enter natural non propulsion swing-by process. But, there are some thinkable points in two cases that one case is using continuous propulsion and second is non using continuous propulsion during planet swing-by scheme. During spacecraft pass away near target planet, spacecraft can be obtained additional velocity increasing by continuous propulsion acceleration, except amount of target planet gravity assistant. When consider continuous propulsion planet swing-by mission, hyperbolic swing-by orbit can be set equality optimal condition that can be defined states variables constraint. In this paper, compare and investigate for two cases