

Orbital maneuvers using a close approach in a return passage by the main body

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The objective of this paper is study optimal space maneuvers that searches the minimum fuel consumption for interplanetary missions that consist of a spacecraft that leaves one celestial body and goes back to this same body, using this return to perform a Swing-By wroth the mother planet to change its velocity, energy and angular momentum. This is called here "Swing-By Maneuvers using Consecutive Collision Orbits". During this approach, the space vehicle place itself in another orbit of the interest of the mission. The dynamics used to solve this problem is the traditional model of the Restricted Three Bodies Problem, so it is assumed that the three bodies involved are mass points and do not suffer external disturbances. The change after the Swing-by in terms of the velocity variation (ΔV) and the energy variation (ΔE) are obtained. Several orbits of multiple encounters and Swing-By were simulated.