

Mars Exploration (3)
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OPTIMAL CONTINUOUS-THRUST, CONSTANT ACCELERATION ORBIT TRANSFER FROM
EARTH TO MARS IN THE FOUR-BODY PROBLEM SCENARIO

Abstract

Optimal control theory is applied to a Mars mission design to minimize the time of flight and reduce the exposure of astronauts to the lethal cosmic radiation and the detrimental effects of zero-gravity during the interplanetary expedition. In this paper, a transfer orbit with a continuous thrust is considered where a constant $1g$ acceleration is maintained to create an artificial earthlike gravity. Simulation results show that the time of flight will drastically be decreased using this optimal transfer method.