



THE CHAOTIC SEA IN CELESTIAL MECHANICS

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A new type of satellite transfer that uses half the amount of fuel as conventional transfers has been discovered. This transfer, called a low-energy transfer, proved to work in 1991 when a Japanese satellite successfully went in orbit around the moon using this technique. Since then, more research has been conducted to prove that a low-energy transfer can be accomplished between the moons of Jupiter. In the case of this current paper, it is shown that a low-energy transfer is possible from Earth to Mars using similar techniques as between the Jovian moons.

This paper examines the existence of a low-energy transfer between the Earth and Mars. It begins by outlining the equilibrium points of any two-body planetary system. These equilibrium points are called Lagrange points. If a satellite has the right amount of energy, then it can pass by the Lagrange point without being pulled into it. A key discovery made in [1] showed that it is possible to transfer between different planets via their Lagrange points. In general, it is possible to create a low-energy transfer between any two celestial bodies using the coupled planar circular restricted 3-body problem.

