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LOW ENERGY TRANSFER STRATEGY TO EXPLORE A MULTI-BODY SYSTEM

Abstract

In this paper we present a new and innovative low energy transfer strategy that aims to be used to explore multi-body systems. Very recently, it was discovered the existence of multiple asteroid system. Sylvia, for example, is the first known to have two moons. Several others were discovered, which allow us to conjecture that more complex multiple asteroid systems may exist. A key point here is how to develop an efficient inter-body transfer strategy that allows one to build a proper exploration tour on these systems. It is know that the phase space associated to a multi-body system presents a complicated structure with coexisting and interwoven chaotic and regular (quasi-periodic) regions. Based on an opportunistic exploitation of the manifold structure and of the sensitive dependence of the chaotic region, we show how a low energy transfer strategy can be obtained that allows a proper exploration of these systems. The effectiveness of our approach is demonstrated by obtaining a trajectory to be used for the scenario of the triple asteroid 2001 sn263.