



Stability of the Artificial Equilibrium Points in the Low-Thrust Restricted Three-Body Problem when the Bigger Primary is a Source of Radiation

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Abstract: This paper investigates the existence and the stability of artificial equilibrium points (AEPs) in the low-thrust restricted three-body problem when the bigger primary is a source of radiation and the smaller one is a point mass. The linear stability of the AEPs has been studied. Firstly, we have derived the equations of motion of the spacecraft in the synodic coordinate system. The AEPs are obtained by cancelling the gravitational and centrifugal forces with continuous control acceleration at the non-equilibrium points. The positions of these AEPs will depend on the magnitude and directions of low-thrust acceleration. Secondly, we have calculated the numerical values of the AEPs and their movement shown graphically for given thrust parameters. We have found the stability regions in the $x - y$, $x - z$, $y - z$ -planes and studied the effect of the radiation pressure on the motion of the spacecraft. Further, we have drawn the zero velocity curves (ZVCs) to determine the possible regions of motion in which the spacecraft is free to move.

Keywords: *restricted three-body problem, artificial equilibrium points, low-thrust, stability, radiation pressure, zero velocity curves.*

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