**A STUDY OF LIBRATION POINTS IN THE PHOTOGRAVITATIONAL CIRCULAR RESTRICTED THREE-BODY PROBLEM WITH ASPHERICITY AND POTENTIAL FROM A BELT**

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**ABSTRACT**

This research has investigated an improved version of the classic restricted three-body problem where both primaries are considered as non-spheroids as well as sources of radiation, and are enclosed by a belt of homogeneous cluster of material points centered at the mass center of the system. It studied the effects of the gravitational potential created by the belt on the existence of libration points and their linear stability when the primaries are: (a) radiating-oblate and (b) radiating-triaxial bodies. To this end, the equations that govern the motion of the infinitesimal body have been derived, and the positions of the libration points are obtained. It has been established that the equations and the positions of the libration points are affected by the aforementioned perturbations, such that in addition to the usual five (three collinear, two triangular) libration points of the classic restricted three-body problem, there exist four new collinear points in the case of radiating-oblate primaries and up to two in the case of radiating-triaxial primaries. The triangular points are seen to be stable for and unstable for where is the critical mass parameter influenced by the radiation and oblateness/triaxiality of the primaries and potential from the belt. The combined effect of these perturbations is a stabilizing tendency when the primaries are oblate and a destabilizing tendency when they are triaxial. The classical three collinear libration points remain unstable, whereas some of the new libration points have been found to be stable. Furthermore, periodic orbits around the stable triangular points owing to the amalgamated effect of the radiation and oblateness up to the coefficient J4 of the primaries and potential from the belt are found to be ellipses.

**KEY WORDS**: Libration Points, Photogravitational Circular Restricted Three-Body Asphericity and Belt

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