

EXISTENCE OF PERIODIC ORBITS IN THE RESTRICTED PROBLEM WHEN PRIMARIES ARE TRIAXIAL RIGID BODIES AND SOURCE OF RADIATION PRESSURE

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The following problems have been studied in the thesis:

1. Existence of periodic orbits in the restricted problem of three bodies when the smaller primary is a triaxial rigid body.
2. Existence of periodic orbits in the restricted problem of three bodies when the more massive body is a source of radiation and the smaller primary is a triaxial rigid body.
3. Existence of periodic orbits (first kind) in the restricted problem of three bodies when the smaller primary is a triaxial rigid body and the bigger primary an oblate spheroid. In all the above problems, we have shown the existence of periodic orbits when the mass parameter $m = 0$ and through analytic continuation, we have shown the existence of Periodic orbits for $m \neq 0$. In the first problem, it is observed that as the values of the parameters s_1, s_2 of the triaxial rigid body increase, the periodic orbits go on shrinking.

4. In the second problem we have again shown the existence of periodic orbits when $m \neq 0$ following the method used by Choudhry (1966). In this paper we have drawn six orbits by taking different values of solar radiation parameter

P ($P = 0, 0.01, 0.009, 0.008, 0.007, 0.006$). Keeping the parameters $s_1 = 0.01, s_2 = 0.09$ of the rigid body fixed. It is observed that as the values of the solar radiation parameter P decrease the periodic orbits shrink, though very little. In the third problem we have shown the existence of periodic orbits of first kind for $m \neq 0$. First, we have determined the equations of motion in Delaunay's variables. This is done through the following three canonical transformations:

- (i) The origin is shifted to the centre of the more massive primary.
- (ii) After shifting the origin, the equations of motion are transformed to the polar

form.

- (iii) And finally we have transformed the equations of motion in the Delaunay's variables.

In the end the existence of periodic orbits for $\mu \rightarrow 0$ is shown by applying the implicit function theorem.

The entire work of this thesis has been sent for publication in the form of three research papers in an Indian Journal. .

- (1) Existence of periodic orbits in the 'Restricted problem' when the smaller primary is a triaxial rigid body. Accepted for publication in the "Indian Journal of Pure and Applied Mathematics". (2001).
- (2) Existence of periodic orbits in the 'Restricted Problem' of three bodies when the more massive body is a source of radiation and the smaller primary is a triaxial rigid body. Accepted for publication in the "Indian Journal of Pure and Applied Mathematics" (2002).
- (3) Existence of periodic orbits (first kind) in the 'Restricted Problem' of three bodies when the smaller primary is a triaxial rigid body and the bigger primary an oblate spheroid. Submitted for publication in the "Indian Journal of Pure and Applied Mathematics" (2001).