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Lyapunov Exponents in the Restricted Three Body Problem under the Influence of Perturbations

Authors : Ram Kishor

Abstract : The Lyapunov characteristic exponent (LCE) is an important tool to describe behavior of a dynamical system, which measures the average rate of divergence (or convergence) of a trajectory emanating in the vicinity of initial point. To analyze the behavior of nearby trajectory emanating in the neighborhood of an equilibrium point in the restricted three-body problem under the influence of perturbations in the form of radiation pressure and oblateness, we compute LCEs of first order with the help of slandered method which is based on variational equation of the system. It is observed that trajectories are chaotic in nature due positive LCEs. Also, we analyze the effect of radiation pressure and oblateness on the LCEs. Results are applicable to study the behavior of more generalized RTBP in the presence of perturbations such as PR drag, solar wind drag etc.

Keywords : Lyapunov characteristic exponent, RTBP, radiation pressure, oblateness
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