

Pseudo-Heteroclinic Connections Between Bicircular Restricted Four-Body Problems

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In this paper we show a mechanism to explain transport from the outer to the inner Solar System. Such mechanism is based on dynamical systems theory. More concretely we consider a sequence of uncoupled bicircular restricted four body problems –BR4BP– (involving the Sun, Jupiter, a planet and an infinitesimal mass), being the planet Neptune, Uranus and Saturn. For each BR4BP we compute the dynamical substitutes of the collinear equilibrium points of the corresponding restricted three body problem (Sun, planet and infinitesimal mass), which become periodic orbits. These periodic orbits are unstable and the role that their invariant manifolds play in relation with transport from exterior planets to the inner ones is discussed.

Keywords

Bicircular problem, periodic orbits, invariant manifolds, heteroclinic connections