

Study of the secular perturbations in the three-planetary four-body problem with isotropically varying masses

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Three-planetary four-body problem with variable masses is considered in a general case when the masses of the bodies vary isotropically at different rates. The problem is investigated in oscillating elements of aperiodic motion on quasi-conic section [1], [2] and [3], using the equations of perturbed motion in the Lagrange form. The equation of the perturbed motion were averaged over the mean longitudes of the bodies in the absence of mean motion resonances and the differential equations describing the long-term evolution of the orbital parameters were obtained. Numerical calculations of the evolution of analogs of orbital elements of planets in an exoplanetary system were performed using evolutionary equations in the Lagrange form and the Wolfram Mathematica computer algebra system.

Keywords: Four-body problem, Variable mass, Non-stationary exoplanetary systems, Aperiodic motion, Perturbations, Wolfram Mathematica

References

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