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Approaches of small bodies with planets

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Abstract

Approaches of small bodies with planets of the Solar system are investigated. Classifications of these approaches are suggested.

1. Low velocity and high velocity approaches

In the first section of the paper the qualitative kinematic analysis for the phenomenon of low velocity approach of small bodies with planets is proposed. The notion of the low velocity tangency points on the orbit of a small body and a planet is given. The notions of the minimum planet-centric velocity, the low velocity and high velocity ranges on the orbit of a small body, the low velocity and high velocity approaches are given.

2. Classifications of approaches of small bodies with planets

In the second section of the paper the classification of approaches of small bodies with planets on the basis of the global minimum of the planet-centric distance is given. This classification is based on the notions of the Hill sphere and the action sphere. The notions of the region and the duration of low and high velocity approaches are introduced.

3. Orbits of low velocity approaches

In the third section of the paper a geometrical method of selection of small bodies as candidates on the low velocity approaches with planets is proposed. The region (a,e) of small body orbits with specific features during the approach is found.

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