

The modeling of the effect of velocity of breakup in osculating orbital elements of the young asteroid family

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Asteroid families are groups of minor planets that have a common origin in breakup events. The very young compact asteroid clusters (VYF) with age smaller than 1 Myr allow us to study impact process and nonlinear dynamics. In previous our paper [1] we had noted dependence between $d\Omega$ and $d\varpi$ for Datura family but had not explained it. Additionally, we find other dependences between angular elements $d\omega$ and $d\varpi$ in some other very young asteroid family. Vokrouhlicky et al. [2] have given explanation but their model cannot proper explain value of observed slope. In this paper we test the hypothesis of the primordial origin of the observed dependences at the epoch of the cluster formation. The implicit dependences of the orbital elements on breakup velocity components are studied with Maple. As a result, the dependences, similar to observed, obtained at specific values of breakup velocities.

Keywords: asteroid family, orbital evolution, breakup velocity

References

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