



Searching for near-Earth asteroid families

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Abstract

We will report on our search for near-Earth asteroid (NEA) families using the method proposed by [1], that relies on finding associations based on the Southworth-Hawkins D-criterion [2], a measure of orbit similarity, and on finding ‘strings’ of objects and a significant fraction of ‘pairs’ within the association. The process of identification of a NEA family is difficult due to the chaotic dynamics of the whole NEA region which is responsible for the rapid diffusion of members of the family into the background and short dynamical lifetime of all objects present. Using 1000 realistic NEA models we determined the statistical significance of the candidate NEA families detected in the real NEA sample from the actual Minor Planet Center asteroid orbital database mpcorb.dat. The identification of an NEA family will provide constraints on the NEA population’s collisional processes and their dynamical evolution and internal structure. Finding a real family in the population (NEA) could in addition put a constraint on the collision rate of NEAs with Earth and help us to better understand forces influencing our nearest space environment.

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References

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