

Asteroid families

A membership of individual asteroids in 141 asteroid families is available at the website of IAA RAS <ftp://ftp.iaaras.ru/pub/vin-ast-fam/>. These data were obtained by T. A. Vinogradova.

Asteroid families represent outcomes of past catastrophic collisions of asteroids. Under the influence of planetary perturbations originally close orbits of debris diverged. Secular perturbations play a main role in this evolution. The perturbations induce oscillations of an osculating inclination and eccentricity at a long time span. That is why the osculating elements can not be used for a family identification procedure. Proper elements should be calculated for this purpose.

The procedure of proper elements calculation and the method of family identification were described in the article by T. A. Vinogradova “Empirical method of proper elements calculation and identification of asteroid families”, (MNRAS Vol. 484, Issue 3, April 2019, P. 3755–3764), <https://doi.org/10.1093/mnras/stz228>). In this work a search for asteroid families was carried out with use of proper elements set comprising 649050 asteroid orbits. As a result, 141 asteroid families were identified in the interval of a semimajor axis 1.8–5.4 au from the Hungaria group to the Jupiter Trojans.

141 files include data on family members such as asteroid number and name or preliminary designation, absolute magnitude, taxonomical type, proper elements (semimajor axis, eccentricity, inclination), diameter and albedo. Interlopers were not excluded from family members.