

The Near Earth Asteroid associations

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Abstract. We searched for associations (not for families) amongst the near Earth asteroids (NEAs) and, similarly as in our previous studies (Jopek 2011; Jopek 2015), a dozen groups of 10 or more members was found with high statistical reliability. We present some details of our most numerous finding: association (2061) Anza which, at the moment, incorporates 191 members.

1. Data, method, result, implication

Applying the cluster analysis technique we made an extensive search amongst the 18291 NEA's retrieved in June 2018 from the NEODyS-2 database (<http://newton.dm.unipi.it/neodyS/>). The most numerous finding was the (2061) Anza association which consists of 191 members. The probability that such a grouping is a statistical fluctuation is less than 1%. In Figure 1 the orbits of the Anza association are illustrated. In Table 1 the designations of its selected members are given. To quantify the orbital similarity we used D_H function (see Jopek 1993) and the similarity threshold was determined by a statistical approach. Regardless of their origin, existence of such associations increase the NEA collisional probability with the Earth. Analogously to meteoroid streams, each year the Earth almost crosses the orbits of such associations. This implies that searching for grouping amongst the NEAs is an important issue.

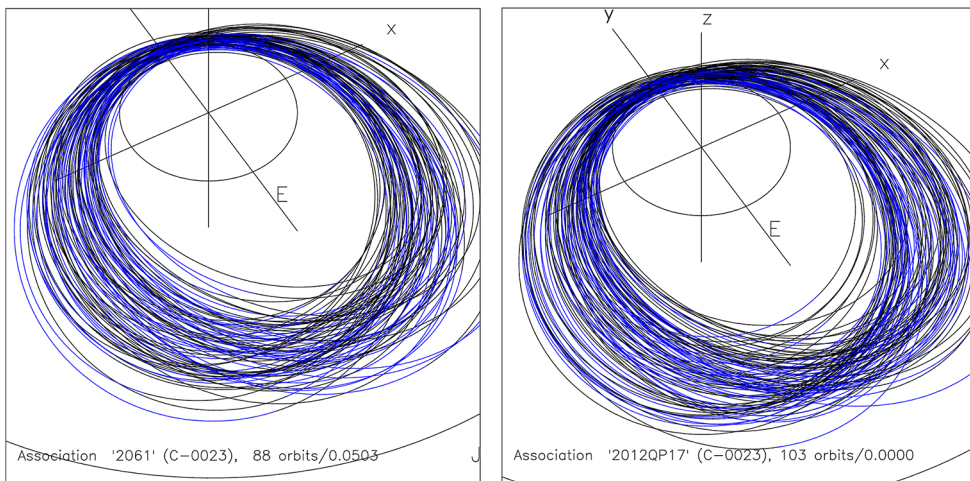


Figure 1. Association (2061) Anza. 191 NEAs of this group were identified: before 2012, 88 orbit on the left panel, and after 2012, 103 orbits on the right. As this example shows, we do not know really how many members are in the Anza association.

Table 1. Designations of 27 selected members of (2061) Anza association.

2061	52760	100085	100085	162183	222008	354030	363831	446826
455322	477719	481989	1991XA	1993UA	1998SS4	1999RB32	1999RK33	1999TM13
2013PD39	2013RO21	2014SE145	2014ST1	2015MT96	2016EU85	2016PS26	2017QW32	2017WT1

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