TIME EVOLUTION OF THE EUNOMIA FAMILY OF ASTEROIDS. I. Włodarczyk[1] and J. Leliwa-Kopystynski[2,3], [1]Chorzów Astronomical Observatory, 41-500 Chorzów, Poland, Al. Planetarium 4, astrobit@ka.onet.pl, [2]University of Warsaw, Institute of Geophysics, Pasteura 7, 02-093 Warszawa, Poland, jkopyst@mimuw.edu.pl, [3]Space Research Centre of PAS, Bartycka 18A, 00-716 Warszawa, Poland.

Introduction: The main goal of this work is to compare long time evolution of orbital elements of the central members of the Eunomia family of asteroids. These members are selected by means of a different manners. Searches are performed for two cases: without and with the Yarkovsky/YORP effects.

Methods of computations: Members of the Eunomia family of asteroids in the present work were taken from the dataset of proper elements of 165357 numberred asteroid [1]. Two methods of selection of asteroids were used. First method, the HCM numerical analysis by [2] that determines ranges of proper orbital elements of the members of Eunomia family in the rectangular box centered at a_p=2.63 AU, e_p=0.15 and i_p=13.2^0. The second method is a statistical one where the members of family are chosen around the largest asteroid (Eunomia) in a given spherical box in the phase space of the proper elements a_p, e_p, i_p (Leliwa-Kopystynski and Wlodarczyk presented on the Catastrophic Disruption Workshop, Alicante, 2007; submitted to PSS). Next, the orbital elements of the 997 central members of Eunomia family in both methods were selected from the Lowell catalogue of asteroid [3]. Then, the starting orbital elements of asteroids and planets for the same epoch were computed with the use of the software Mercury [4] and added as input files to the software Swift [5]. Long time evolution of the orbital elements of the members of Eunomia family were computed without and with the Yarkovsky/YORP effects. Diameters of asteroid were taken from the Lowell catalogue. The suitable physical parameters: bulk density [kg/m^3], surface density [kg/m^3], thermal conductivity [W/K/m], thermal capacity [W/kg/K], albedo, infrared emissivity, rotation period [h] were estimated from [5] as well as a randomly distributed spin axes. Then, the results from both methods were compared for forward and backward integrations. First results of forward integration of equations of motion of selected asteroids show that behavior of the central asteroids of Eunomia family are less dependent on the Yarkovsky/YORP effects in the case of our selection to the contrary with the HCM method. Probably it is connected to the greater concentration of asteroids with biggest masses around Eunomia. However in both cases we can observe concentration of asteroids in the phase space (a, e, i) around of defined center of asteroid family.

References: [1] Knezevic, Z., Novakovic, A., Milani, A. (2008), http://hamilton.dm.unipi.it/astdys /propsynth/numb.syn; updated in Dec 2007. [2] Zappala, P., Bendjova, P., Farinella, P., Froeschle, C. (1995), Icarus 116, 291-314. [3] ftp://ftp.lowell. edu/pub/elgb/astorb.html. [4] Chambers, J.E. (1999), Mon. Not. R. Astron. Soc., 304, 793. [5] Broz, M. (2003) http: //sirrah.troja.mff.cuni.cz/~mira/mp/.