MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE
RESEARCH INSTITUTE “NIKOLAEV ASTRONOMICAL OBSERVATORY”

METHODS AND INSTRUMENTS IN ASTRONOMY: FROM GALILEO TELESCOPES TO SPACE PROJECTS

International Workshop

ABSTRACT BOOK

May 17-20, 2010,
Mykolaiv, Ukraine

and photometric data on objects of this series, and knowing the shape and physical size of satellites, it is shown as changes in these moments affect the value of own satellite's rotation. The periods of own rotation of the objects are calculated using the light curves of more than 35 years.

ASTROMETRY OF DYNAMICALLY NEW DISTANT COMETS WITH THE 2-M TELESCOPE OF PEAK TERSKOL OBSERVATORY

I. Kulyk[1], N. Maigurova[2], A. Sergeev[3]

[1]Main Astronomical Observatory of NAS of Ukraine, Kyiv, Ukraine; irinakulyk@yahoo.com.

[2]Reseach Institute "Nikolaev Astronomical Observatory", Mykolaiv, Ukraine.

[3]International Center for Astronomical, Medical and Ecological Research, Kyiv Department, Ukraine.

Three dynamically new comets C/2008 S3 (Boattini), C/2006 S3 (LONEOS), C/2006 W3 (Christensen) were observed at Peak Terskol observatory in October 2008. These long period comets are thought to belong to the population of Oort Cloud, one of two main reservoirs supplying the inner region of the Solar System with comet nuclei. Being scattered in the inner region of the Solar System, these objects often experience perturbations from the planets, therefore, their dynamical history is sometimes complicated. In order to contribute to the better knowledge of the orbital elements of these dynamically new comets, we astrometrically processed the CCD images obtained with the 2-m telescope in the frame of the project of spectrophotometric investigations of distant active comets.

We used the focal reducer that converts the initial focal ratio of f/8 to f/2.8 providing an image scale of 0.89″/pxl. B, V, R broadband filters allow us to investigate a possible displacement of the photometric centers of the cometary comae at the different wavelengths. The images were processed with IZMCCD software developed by I. Izmailov at Pulkovo. The reference star positions were taken from 2MASS catalogue. The derived positions of the comets were compared with ephemerides provided by the HORIZONS system. The RMS residuals of comet C/2006 S3 do not exceed of 0.2 arcsec in the V and R bands and amount to 0.4 arcsec in the B band. The detectable displacements of photo centers at the different bands were not recorded for this comet.

Comet C/2008 S3 was at large heliocentric distance and, therefore, it was faint enough with the magnitude around 17.5. The accuracy of the derived positions was at the level of 0.3 arcsec. C/2006 W3 (Christensen) was approaching its perihelion at the time of the observations and therefore it showed a high level of the activity with considerable outgassing. The analysis of comet's positions derived through the different filters shows both the good measurement accuracy, less then 0.1 arcsec, and the dependence of (O–C) values on the wavelength. This may be attributed to the fact that the photo centers of the images obtained in the blue and red wavelength regions belong to the gaseous and dust components of the cometary coma respectively.

FRACTALS IN THE GEOMETRIC CONFIGURATIONS OF SATELLITE (ASTEROID) SYSTEMS

G.S. Kurbasova

Research Institute "Crimean Astrophysical Observatory", Nauchny, Crimea; gskurb@gmail.com.

In the limited domain of existence of the structure of "planet-satellite (asteroid)", stable proportions between the physical and geometrical parameters are generated, which ensures their mutual determination. The present paper deals with geometric shapes and structures in the satellite (asteroid) systems with fractional spatial dimension possessing the property of self-similarity (fractals). The results of calculating basic quantitative characteristics of self-similar structures - fractal dimension are given. The connection between the geometrical and physical parameters in the satellite (asteroid) systems based on the calculated fractal dimensions is presented to test the method which is using physical and geometrical characteristics of the shapes and the orbits of the Earth system – Moon, Jupiter, Galilean satellites, obtained by the spacecraft mission. Differences in definitions of the mass ratios of the satellite (asteroid) / planet of the geometric and dynamic methods do not exceed 0.001%.