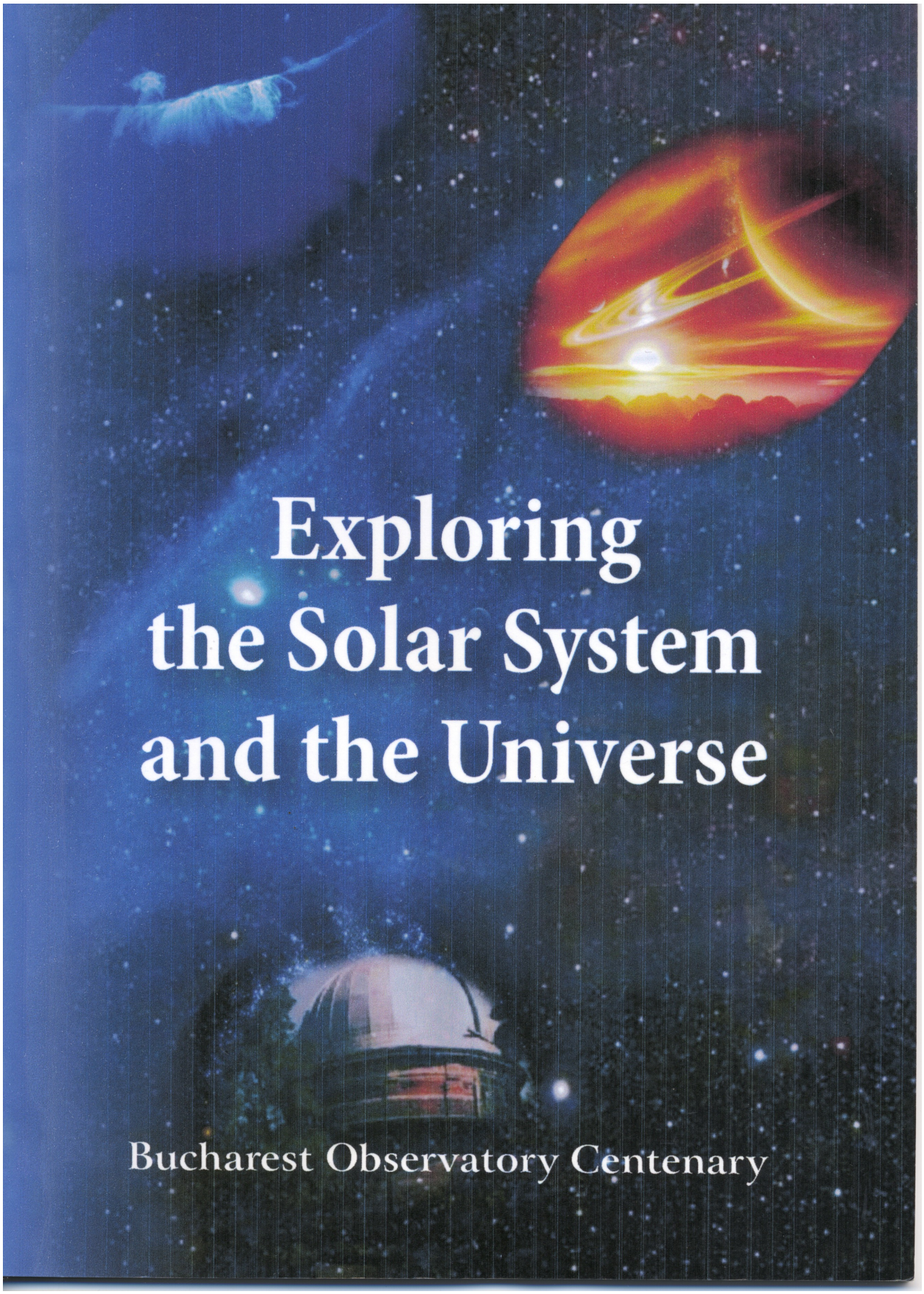
Exploring
the Solar System
and the Universe
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Error Statistics for Position Observations of Numbered Asteroids in Six Observatories of the World

Lyudmyla A. Hudkova, Anatolyi V. Ivantsov

Abstract:
More than 41 millions of positions for numbered asteroids were analyzed by the Minor Planet Center by December 25, 2007. Observations of six observatories (codes 089, 413, 568, 673, 689, 950) out of 398 observatories of the world were marked as high-accuracy by the Minor Planet Center. Consideration of observational accuracy is extremely important for the numerous applications of celestial mechanics. Comparison of the observed (O) positions, taken from the database of the Minor Planet Center for these six observatories, and calculated (C) ones using the HORIZONS ephemerides system is presented in the paper. Error statistics of the position observations were calculated using the (O-C) formulation. The subsequent analysis is given.

Position Observations of NEAs at the RTT-150

Anatolyi Ivantsov, Lyudmyla Hudkova, Zeki Aslan, Rusten Gumerov, Igor Khamitov, Gennady Pinigin

Abstract:
In 2004-2007, about 550 observations of 17 near-Earth asteroids (NEA) of 15-20.5 magnitude were made at the Russian-Turkish telescope (RTT-150). The reduction was made using the UCAC2 and USNO-B1 catalogues. The comparison of the observed and calculated positions through the HORIZONS system gave standard errors of a single position in 0.05-0.50″. Analysis of the (O-C) is given in the paper.

Parametric Influence on the 3D Motion of a Charged Particle in the Electromagnetic Field Produced by Two Co-Rotating Magnetic Oblate Dipoles

Tilemahos Kalvouridis

Abstract:
The systematic study of the motion of charged particles in the electromagnetic field of a rotating magnetic dipole started with Sturmer at the beginning of the 20th century. Sturmer, using a simple model and a robust mathematical formulation, tried to approximate some physical phenomena, such as the polar aurora, that take place in the neighbourhood of Earth. The problem of Sturmer re-opened in the decade of the 50's after the discovery of the Van Allen belts. Since then, many improvements have been made in his original idea, while new models have been proposed, such as the one described by Tsyganenko, as well as the 'magnetic-binary problem' (otherwise called 'the problem of two rotating dipoles'). In the former model, the simple simulation of the Earth's field with a dipole is replaced by a very complex one, which represents the magnetic field of our planet in a more realistic manner. The latter model combines the restricted three-body problem and the initial idea of Sturmer and is more generally