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Abstract Book

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5850:Phoebe's orbit from ground-based and space-based observations

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Phoebe is the ninth satellite of Saturn and presents a retrograde orbit. The orbit of Phoebe is not so accurate for three main reasons. The dynamical models are sometimes too basic (taking into account only perturbations of planets), the astrometry is not homogeneous and the Phoebe's position is dependant to Saturn's theory (planetary ephemerides). Consequently, we have developed a new dynamical model by taking into account the perturbations of the main planets and of the Saturnian satellites (using the most recent theories) and the Saturn's flatness. In order to fit the dynamical model, we have compiled more than 3000 observations from 1898 to 2011 including ground-based observations and space-based observations from Voyager and Cassini. Some observations in the early XXth century have been reduced with accurate stellar catalogue and most of ground-based observations have been treated from bias of stellar catalogues. Finally, we present an accurate orbit of Phoebe and a comparison with the previous theories.

5736:Progress of Astrometric Research in Nikolaev Observatory

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A catalog of astrometric positions and proper motions of 140237 stars in fields of ecliptical zone and high proper motion stars was derived from CCD-observations made at AMC telescope (Nikolaev) in 2008-2009. The UCAC2 catalog was used as a reference one for astrometric reductions. The standard error for a single position is 20-65 mas in right ascension and 30-70 mas in declination. Cross–identification of the obtained data with modern astrometric catalogs such as TYCHO2, 2MASS, CMC14, PPMX, XPM, USNO-A2.0 and XPM-1.0 was made for investigation systematical errors and calculation of the proper motions [1]. The final catalog contains star positions, proper motions as well as photometric data (B, V, r′, J, H, K) taken from other catalogs. For analysis of

perturbed motion of selected asteroids, there was made astrometric reduction for three thousands of positions of 68 selected asteroids observed at the Russian-Turkish telescope RTT150 in 2008-2011 [2]. The research is conducted within the International Joint Project between IMCCE (France), NAO (Ukraine), KFU (Russia), and TUG (Turkey). The reduction was made with the UCAC2 and UCAC3 catalogs. The standard error of a single position is 0.15 arcsec in right ascension and 0.13 arcsec in declination. Also, the first results of astrometric reduction are presented for the observations of selected asteroids made at the AZT8 (Evpatoriya) and Mobitel (Nikolaev) telescopes. The obtained positions are expected to be used for derivation masses of asteroids by dynamical method. This work is supported by State Agency on Science, Innovation and Information of Ukraine, Russian Foundation for Basic Research. 1. Jin, W., Pinigin, G., Tang, Zh., Shulga, A. (2011). The collaboration between ShAO and NAO: Celebration of the 190th anniversary of NAO. Proc. Int. Conf. "Astronomical Research: from near-Earth Space to the Galaxy", Nikolaev (pp. 92-104). 2. Ivantsov, A., Gumerov, R., Khamitov, I., Aslan, Z., Thuillot, W., Pinigin, G., Hestroffer, D., Mouret, S. (2011). Analysis of Astrometry and Photometry Observations of Asteroids at the RTT150. Proc. Workshop "Gaia Follow-up Network for Solar System Objects", Paris (pp. 93-96).

8516:Relativistic Spherical Multipole Moments in Astronomy

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In this paper, a simple and reasonable relation between relativistic Cartesian and spherical multipole moments with harmonic gauge in the post-Newtonian framework is presented. How to define the time slowly-changing relativistic spherical multipole moments is investigated and discussed in detail. And with these multipole moments, the equations of motion of celestial body and photo are derived. In order to meet high-precision requirements, we believe, it is necessary for us to adopt these equations in the future astronomical practice.

6216:Researches on predictions of Earth orientation parameters

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Earth orientation parameters (EOP) are essential for transformation between the celestial and terrestrial coordinate systems, which has important applications in the Earth sciences, astronomy and navigation system. In this report, we firstly describe the principles and analyze the characteristics of several commonly used EOP prediction