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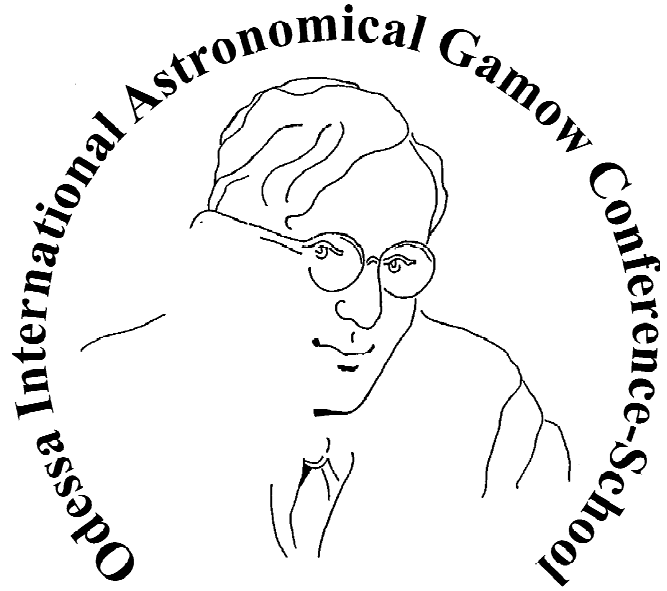

ABSTRACTS

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SUBSECTION "ASTROINFORMATICS"

FIRST RESULTS OF PROCESSING DIGITIZED V-PLATES TAKEN WITH THE TAUTENBURG 2M SCHMIDT TELESCOPE

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The process of treatment of about 500 digitized plates has started in MAO NAS of Ukraine. Plates were taken in the V-band of the Johnson color system with the Tautenburg 2m Schmidt telescope in 1963-1989. The plate reduction is carried out in the GAIA DR2 reference system. Linear dimensions of plates are 24x24 sm with a working field of 3.3x3.3 degrees and a scale of 51.4 "/ mm. Astronegatives were digitized on the Tautenburg Plate Scanner in five strips with linear dimensions of 5400x23800 px. The software developed in MAO NAS of Ukraine for the image processing of these scans takes into account the horizontal overlap and the vertical offset of strips. The photometric range of fixed objects is 12 magnitudes, around V = 7^m - 19^m, due to the separation of objects into faint and bright parts by their images' diameters.

REDSHIFT RECONSTRUCTION WITH MACHINE LEARNING METHODS FOR THE SDSS GALAXIES

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We estimate a data-driven approach as an option instead of traditional photometric techniques to determine distance moduli m-M to the galaxies. In our previous work (Elyiv et al., 2020, Astron. & Astrophys.), we worked with five machine learning regression techniques for inference of m-M: Linear, Polynomial, K-Nearest Neighbors, Gradient boosting, and Artificial Neural Network, and obtained RMS error 0.35 mag, which corresponds to relative error 16%. We compiled two samples of galaxies from the NED and limited velocities to 1500 km/s < VLG < 60000 (30000) km/s.

In this work, our target dataset consists of 464 208 galaxies at 0.2<z<1.0 from the SDSS DR14. We used key observable parameters such as the corrected Petrosian fluxes, Petrosian radii, inverse concentration index R50/R90 in g-, r-, i-, z- bands, color indexes g-r, g-i, g-z and celestial coordinates in 3-D cartesian representation as input explanatory variables for training and redshift as the target parameter. We tested the usage of five machine learning regressions (Linear, Polynomial, K-Nearest Neighbors, Gradient boosting, and Artificial Neural Network) to predict redshifts applying these observable parameters.

We found that usage of the ANN regression model with two hidden layers is the most effective. The obtained root-mean-square error for the calculated redshifts is equal to 0.046, corresponding to a relative error of 8%. The proposed model is complementary to the existing photometric redshift methodologies.

FON-DUSHANBE CATALOG. RESULTS OF PROCESSING IN THE TYCHO-2 SYSTEM

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In the Tycho-2 catalog system the processing of FON-Dushanbe plates from the collection of the Institute of Astrophysics of the Academy of Sciences of the Republic of Tajikistan was completed. Approximately 1560 plates with the size of 8º×8º (30x30 cm) were exposed in the period of 1985-1992 in the zones from -10º to + 86º. The plates were digitized using a Microtek ScanMaker 1000XL Plus scanner with the resolution of 1200 dpi, so the size of the digitized images is near 13000x13000 px. The average internal accuracy of the catalog for all objects is $\sigma_{\alpha\delta} = \pm 0.32$" and $\sigma_B = \pm 0.13^m$ (for stars in the range of B = 7^m -14^m the errors are $\sigma_{\alpha\delta} = \pm 0.20$" and $\sigma_B = \pm 0.08^m$) for equatorial coordinates and stellar B -magnitudes respectively. The convergence between our calculated and reference positions from the Tycho-2 catalog is $\sigma_{\alpha\delta} = \pm 0.12$", $\sigma_{BT} = \pm 0.19^m$, and the convergence with photoelectric B-magnitudes is $\sigma_B = \pm 0.16^m$. The root-mean-square value of the difference between the coordinates of our catalog and the UCAC-4 catalog is $\sigma_{\alpha\delta} = \pm 0.40$". Five astronomical institutions took part in the processing of the photographic plates and the creating of the FON-Dushanbe catalog: Institute of Astrophysics of AS of Republic of Tajikistan; Walter Hohmann Observatory, Essen, Germany; Ulugh Beg Astronomical Institute UAS, Uzbekistan; Research Institute "Mykolaiv Astronomical Observatory", Ukraine and Main Astronomical Observatory NASU, Ukraine.

REREARCHES OF HOST STAR CHROMOSPHERIC ACTIVITY VARIATIONS IN EXOPLANET SYSTEMS HD 189733 AND HD 68988

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Some results for research of interactions between extrasolar giant planets and their parent stars based on variability of host star chromospheric activity are presented in paper. We used original photometrical data obtained for two exoplanet systems HD 189733 and HD 68988 with close giant planets having short orbital periods. Presuma-