RIGIDITY ESTIMATION OF THE HIPPARCOS SYSTEM IN THE EQUATORIAL ZONE BY 20-TH CENTURY GROUND-BASED OBSERVATIONS

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The external systematic accuracy of the HIPPARCOS positions and proper motions in the equatorial zone as represented by the subset of its bright FK5 stars is estimated by comparison with modern ground-based catalogues of 1980-1990s as well as with the most precise compiled catalogues made in the 20th century. Significant zonal and regional systematic differences between HIPPARCOS and ground-based catalogues have been detected for the different epochs ranging from 1920 to 1990. The most typical behaviour of the analysed differences at the epoch 1991.25 is almost absence of small-scale deviations and presence of the large-scale features. For the epoch 1920, both large and small-scale discrepancies are more pronounced reaching up to 50 mas. This gives evidence of the inferiour consistency of the HIPPARCOS system with ground-based observations comparing with the best compiled catalogues.

EARTH ORIENTATION PARAMETERS 1899.7–1992.0 IN THE HIPPARCOS REFERENCE FRAME

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The optical astrometry observations of latitude/universal time variations made with 48 instruments at 31 observatories are used to determine the Earth orientation parameters (EOP) since the beginning of the century. The Hipparcos Catalogue is used to bring more than four million individual observations, made in the interval 1899.7–1992.0, into the International Celestial Reference System. The Earth orientation parameters (polar motion, celestial pole offsets and, since 1956.0, also universal time UT1) are determined at 5-day intervals, with average uncertainties ranging from 8 mas (in the eighties) to about 40 mas (in the forties). Making use of very long series of ground-based observations, the solution also leads to the improvement of proper motions of about ten per cent of the observed Hipparcos stars, with precision of $\pm 0.2 - 0.5$ mas/yr. In addition, 474 auxiliary parameters, describing the rheological properties of the Earth and seasonal deviations of the observations at contributing observatories, are found. The new solution provides the EOP series suitable for further analyses, e.g., for studying long-periodic polar motion, length-of-day changes or precession/nutation.

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