

3.6.2.10 Institute of Applied Astronomy (IAA)

Comparison and combination of EOP series

During the last year, we continued to develop software for comparison and combination of EOP series with the purpose to generate an independent combined EOP series with better uncertainty and systematic stability than individual ones computed at the IAA (24h and Intensives VLBI, GPS and SLR). Special goals of this study are the computation of dense UT1 series for alignment of satellite free-running UT1 series and the analysis of combined celestial pole offset series for investigation of the nutation models. Special attention is paid to long-term stability of computed EOP series. Developed algorithms and software are routinely used in the framework of every-day IAA EOP Service activity for the control of data and result quality, and for the study of systematic errors of EOP series.

On the basis of this researches, we have been performing an experimental computation of combined EOP series (LOD, UT1, PM) based on VLBI, GPS and SLR series routinely computed at the IAA in the framework of the regular IAA EOP Service, and also combined CIO offset series using results of other IVS Analysis Centres.

Combination of the EPN Analysis Centres' solutions

We have finished the development of the first version of software for combination of the EPN Analysis Centres' solutions for the coordinates of the GPS stations of the EUREF Permanent GPS Network (EPN). The combination is done in three steps: first the stated constraints on coordinates are removed from the individual solutions of the Analysis Centres using a priori information provided in SINEX files. Then de-constrained solutions are aligned to ITRF2000 using 7-parameter Helmert transformation, ITRF2000 station velocities are used here for the propagating ITRF2000 stations' coordinates from the catalogue's epoch 1997.0 to each GPS week. Finally all individual solutions are combined using a sequential Least-Squares Adjustment method.

Starting with 2005 we perform routine computation of the coordinates of all EPN stations, after the Analysis Centres' solutions became available. Our combined solution is available in SINEX format at web page <http://www.ipa.nw.ru/PAGE/DEPFUND/GEO/ac_gps/> or directly via <<ftp://quasar.ipa.nw.ru/pub/EOS/IAA/epn/combined>>. A homogeneous series of weekly solutions from GPS week 900 is available.

This work is supposed to be followed by a TRF+EOP combination in the framework of the IERS activity.

Comparison and combination of radio source catalogues

Research on comparison and combination of the radio source catalogues is being conducted in the framework of the IVS and IAU activity on new ICRF realization. The purpose is to compare the individual CRF solutions, analyse their systematic and random er-

rors, and to compute a combined CRF solution with focus on the choice of the optimal strategy for the next ICRF realization.

Eight radio source catalogues provided by the IVS Analysis Centres (GA, SHAO, DGFI, GIUB-BKG, JPL, MAO NANU, GSFC, USNO) have been analysed. In the present study, four analytical models were used to investigate the systematic differences between solutions: solid rotation, rotation and deformation, and expansion by orthogonal functions: Legendre-Fourier polynomials and spherical functions. It was found that expansions by orthogonal function fit the differences between individual catalogues better than the two former models.

Finally, a combined radio source catalogue was generated. Test EOP series obtained with the combined CRF realization showed improvement of EOP precision with respect to the solution obtained with the ICRF radio source positions.

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