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Consistency assessment of celestial pole offset series

Z. Malkin (1,2)
(1) Pulkovo Observatory, St. Petersburg, Russia; malkin@gao.spb.ru, (2) St. Petersburg State University, St. Petersburg, Russia

Celestial pole offset (CPO) are the small corrections to the official International Astronomical Union (IAU) precession-nutation model. It is needed to account for CPO corrections, in particular, to the users required highly accurate transformation between terrestrial and celestial reference frames in such applications as astrometry, Earth rotation, geodesy, ground and space navigation, etc. Nowadays, the primary method to derive CPO is the very long baseline interferometry (VLBI). CPO is determined along with other Earth rotation parameters polar motion and Universal time from special observations coordinated by the International VLBI Service for Geodesy and Astrometry (IVS).

The CPO time series are initially computed at the IVS Analysis Centers (ACs) as routine product. Each analysis center computes its own final CPO time series containing results obtained for each processed 24-hour VLBI session, and/or datum free normal equations for each session. These results are archived in the IVS Data Centers. The latter data are also used in the IVS Coordinator Office to derive the IVS combined CPO series, also given for each VLBI session. IVS combined series is also placed in the IVS Data Centers. In turn, IERS Combination Centers use original ACs' and/or IVS combined CPO series to derive the IERS combined product, given in this case at the midnight epochs, available through the IERS Product Centers. All these transformations between the original series derived by the IVS Analysis Centers and final IERS products recommended and usually used by users, may introduce random and systematic differences between CPO series available to users, which evidently requires clear recommendations on using this kind of VLBI product. This study is devoted to investigation of differences between various CPO series to make the first steps towards such recommendations.