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Estimating the Celestial Reference Frame via Intra-Technique Combination

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One of the primary goals of VLBI is the determination of a CRF. Currently the third realization of the internationally adopted CRF, the ICRF3, is under preparation. In this process, various optimizations are planned to realize a CRF which does not only benefit from the increased number of observations. For instance, various campaigns have been performed to sample the southern hemisphere with a better density. Furthermore, the VLBI Calibrator Surveys have been redone. Further optimizations of the ICRF3 with respect to the prior versions will be obtained on the analysis side. The new ICRF will benefit also from an intra-technique combination as it is also done for the TRF. Following IUGG Resolution No. 3 (2011) this approach can then easily be extended to a consistent estimation of CRF, TRF and the EOPs, based on the observations of different geodetic space techniques.

Here, we aim at estimating an optimized CRF by means of an intra-technique combination. The solutions are based on the input to the official combined product of the International VLBI Service for Geodesy and Astrometry (IVS), also providing the radio source parameters. We discuss the differences in the setup between the classical TRF-EOP combination and an extended CRF-TRF-EOP combination. Furthermore, we investigate the differences between the combined CRF and the CRFs for the individual ACs. Finally, the impact on the TRF and the EOPs are analyzed to demonstrate the benefits of our enhanced combination procedure.

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