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Earth Orientation Parameters from VLBI and GNSS Combined at the Normal Equation Level

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Current reference series (C04) of the International Earth Rotation and Reference Systems Service (IERS) are produced by a weighted combination of Earth orientation parameters (EOP) time series built up by combination centers of each technique (VLBI, GNSS, Laser ranging, DORIS). In the future, we plan to produce EOP by a direct combination of the normal equation of the four techniques.

We present an intermediate step of this project: a combination of VLBI and GNSS pre-reduced, constraint-free, normal equations with the DYNAMO geodetic analysis software package developed and maintained by the French GRGS (Groupe de Recherche en Géodésie Spatiale). The used normal equations are those produced separately by the IVS and IGS combination centers.

Our series cover 2002-2016. The estimation strategy consists of fixing quasar coordinates to their optimal values given by the latest realization of the International Celestial Reference Frame (ICRF), and most of station coordinates to the ITRF 2014 except for stations undergoing strong nonlinear displacements caused by, e.g., postseismic relaxation. These station coordinates are estimated as time series. The resulting EOP series are compared to intra-technique combinations and to the IERS-C04 reference series.