

The impact of parameterized source positions on the free core nutation

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Abstract. The positions of the radio sources in the ICRF3 catalog, representing the newest realization of the Celestial Reference Frame (CRF), are given as time invariant coordinate pairs. Refusing to acknowledge systematics within the source positions leads to a deterioration in the quality of the frame, and thus in all derived variables, such as the Earth orientation parameters (EOP). A proven approach to overcome these shortcomings is to extend the parameterization of source positions using the multivariate adaptive regression splines (MARS). They allow a great deal of automation, by combining recursive partitioning and spline fitting in an optimal way.

As this parameterization changes the instantaneous CRF, consequently it could have a negative impact on the EOP (i.e. slight deterioration of the accuracy/consistency), especially in the CPO (celestial pole offsets). Here, we present first results on the impact of this parameterization of the source positions on the EOP and the estimation of the free core nutation. This study was carried out from an analysis of VLBI sessions in the period 199X–20XX.