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Nutation offsets inferred from the VLBI/GPS-based normal equations combination

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It seems that all individual space and ground-based techniques like, for instance, VLBI and GNSS almost reached their limit in accuracy and stability of their provided products. Therefore, one of the most promising ways for the further improvements is an integration of information collected by each individual technique. This can be done rigorously either by combining at the observational level or at the level of normal equations (Neqs). The main goal of this work is to stack GPS- and VLBI-based normal equations in order to produce a time series of combined nutation values. For this purpose we use VLBI-based normal equations produced by means of CALC/SOLVE software and GPS-based Neqs processed by Bernese v.5.0 software at the common time period of CONT08 observational program (12-26 Aug., 2008). In order to verify the quality of combined solution we performed its comparison with respect to: 1) the IERS C04 time series; 2) another combined solution constructed at the time series level by means of the Vondrak smoothing filter (using the nutation offsets/rates from Solution/Estimation blocks of the same Neqs). The comparison between rigorously combined EOP values and IERS C04 values shows rather good agreement for polar motion. The correspondence for UT1-UTC and nutation offsets is worse probably due to the systematic errors introduced by GPS orbits missmodeling and unsuitability of IERS C04 for such a comparison (since the nutation values given by IERS C04 are the interpolated ones).