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Introduction The CRC is an integral part of the Center for Earth Dynamics Research (CEDR) that joins four Czech research institutions active in astronomy and geosciences. The combination research was based on combining non-SINEX particular solutions of different techniques (GPS, VLBI, SLR, Doris) to determine the Earth orientation parameters simultaneously with station coordinates. Our PhD student, Vojtěch Štefka, is responsible for solving this problem.

Combination of EOP and station coordinates We used constraints, similar to the ones used to define ‘smoothness’ of the resulting curve in Vondrák smoothing method, in order to ensure the continuity and smoothness of Earth Orientation Parameters of our non-rigorous combination. To this end, a transfer function, corresponding to appropriate value of the weight for these constraints, was empirically estimated and used to compute three-year solution (Štefka et al. 2008a). The results were compared with IERS C04 series, with the rms differences between the two solutions being 0.129 mas, 0.102 mas and 0.0536 ms for polar coordinates x , y and UT1-UTC, respectively. Our numerical solutions of the combination were originally based on solving full normal equation matrix, which was a rather time consuming task. Therefore, a more effective algorithm of solving sparse systems of linear equations from the GNU Gama package (Čepek and Pytel 2005, <<http://www.gnu.org/software/gama>>) was implemented and applied to six-year series of observations (Štefka et al. 2008b). This decreased the necessary computation time by about one order. Instead of rigorous constraints, additional pseudo-observations were used to ensure the smoothness of EOP. Time series of EOP and station coordinates obtained by this method were then compared with IERS C05 solution and ITRF2005, respectively (Štefka et al. 2009). The rms differences between our combination and IERS C05 in 4-year interval were 0.141 mas, 0.146 mas and 0.169 ms for polar coordinates x , y and UT1-UTC, respectively. Time series of station coordinates proved good agreement with the trends in ITRF2005.

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