

COMBINATION OF DIFFERENT SPACE GEODETIC TECHNIQUES: ALGORITHM OF PARAMETERS ESTIMATION

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ABSTRACT. Main principles of organization of parameters estimation for combination analysis are listed. Algorithm for estimation of parameters with an arbitrary time interval are described. Program realization of the algorithm are illustrated.

1. PARAMETERS ESTIMATION FOR COMBINATION ANALYSIS

The organization of parameters estimation is one of the main problem of the combination analysis. It is divided on three basic tasks: organization of recursive data analysis; combination of different types of parameters in one solution; estimation of parameters which are defined on an arbitrary time intervals.

A new algorithm for estimation of parameters with an arbitrary time interval was developed. It presents the following main features: least squares method realized with the square-root information filter are used for parameters estimation; forward pass of data processing is used for formation of normal equations system; then global parameters are estimated and on the backward pass local and stochastic parameters are evaluated.

2. IMPLEMENTATION

The presented algorithm for estimation of parameters was implemented in the software STEELBREEZE.

As an example, we present an estimation of Earth orientation parameters (EOP) on the interval January 12–24, 1994. Here three VLBI networks performed observations, CONT-94, NAVex and R&D. One VLBI session of NEOS-A network also observed during this period.

The data analysis was performed using the IERS Conventions (2003) models. For the whole set of observations the coordinates of stations and sources were estimated. Their values were used as a priori for further tests. Then the EOP for separate networks and common set of observations were estimated (figure 1).

3. CONCLUSIONS

Proposed algorithm of parameters estimation has the following advantages. First, proposed algorithm is suitable for combined analysis of different space geodetic techniques. Second, this algorithm of parameters estimation allows to decrease sizes of working matrices, which leads to improving of data processing performance.

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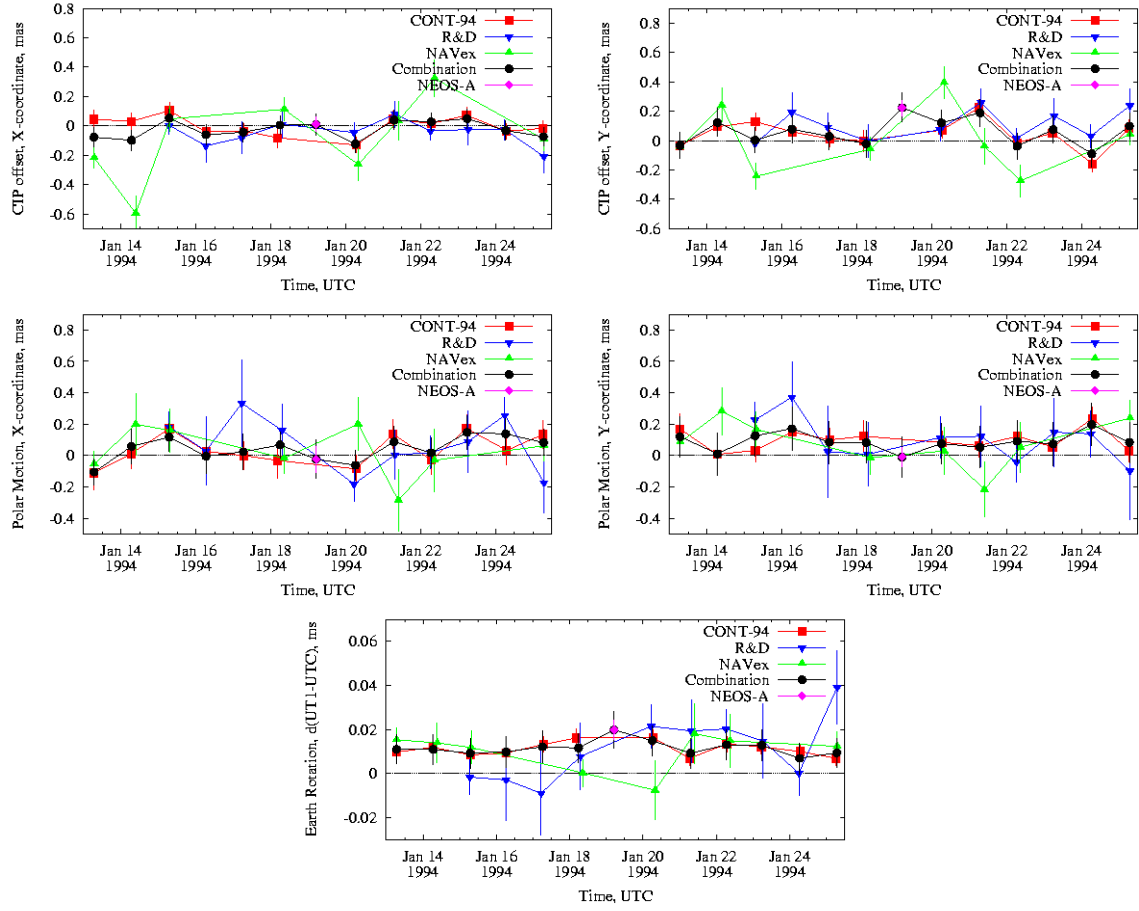


Figure 1: Estimations of EOP on separate VLBI networks and combined solution

4. REFERENCES

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