

Analysis Center of Saint-Petersburg University

Maria Kudryashova, Veniamin Vityazev

Abstract

The contribution of the Analysis Center of Saint Petersburg University for IVS in the year 2004 consists in routine estimations of EOP time series and UT1-UTC values. Information about activity, staff members and background information is included in this report.

1. Introduction

Sobolev Astronomical Institute is located in Petrodvorets, near St. Petersburg. It is a research institute of the Saint Petersburg State University. In 1998 the institute became an IVS Analysis Center at Saint Petersburg University. The main activity of AC SPU for the International VLBI Service consists of routine processing of R1, R4, and Int1 sessions (and their predecessors).

2. Activities in 2004

This year we continued to contribute our time series to IVS. Detailed description of our spu0002.eopi solution (time series which is the result of Int1 observational program processing) is given in [1]. The routine data processing requires a number of typical actions, so we focussed our efforts on the automation of this process. As a result, processing of intensive sessions is almost completely automated.

As for 24-hour sessions, during the processing of some sessions the χ^2 value may become greater than one. In this case OCCAM software automatically reweights “bad” observations. It may occur that automatic reweighting is not enough. Usually this is caused by nonlinear behavior of clocks at one VLBI site. In this case, there are few ways to correct the situation: for example, to consider clock rate of the site as a stochastic process or to correct the “jump” in maser behavior. At this stage we have some problems with complete automation of the procedures. The main details of the EOP time series spu0003i.eops preparation are summarized below:

- Data span: 1989.01.02-2004.12.29
- Estimated parameters:
 1. TRF: for stations with unstable coordinates we estimate corrections for their locations for every session. VTRF2003 is used as an a priory TRF.
 2. EOP: $x, y, UT1 - UTC, d\psi, d\epsilon$
 3. troposphere: troposphere gradients are estimated as constant parameters, wet troposphere delay is modeled as a random walk process.
 4. station clocks are treated as follows: offset as a random walk process, rate as a constant
- nutation model: IAU 1980
- technique: Kalman filter
- software: OCCAM v.5_1

Also, during the past year work on the preparation of a global solution was conducted at the analysis center. At this stage we studied the problem of selecting stable radiosources, whose coordinates could be estimated as global parameters. First results were reported in [2].

3. Staff

The staff members who are involved in the activities of the Analysis Center are listed below:

- Veniamin Vityazev – Director of Astronomical Institute of Saint-Petersburg University, PhD., Prof. General coordination and support of activity at the Astronomical Institute.
- Maria Kudryashova – Research assistant of Astronomical Institute of Saint-Petersburg University. Processing of VLBI data.
- Julia Sokolova - Student of Saint-Petersburg University. Processing of VLBI data. Graduated from Saint-Petersburg University in Oct, 2004. Since the date, J.Sokolova is working at the Institute of Applied Astronomy.

References

- [1] Kudryashova, M., Analysis center of St. Petersburg University In: International VLBI Service for Geodesy and Astrometry 2003 Annual Report, NASA/TP-2004-212254, N. R. Vandenberg and K. D. Baver (eds.), 161–162, 2003.
- [2] Sokolova, J., Influence of the early VLBI observations on the ICRF stability, In: Proc. Journées 2004, Paris, 2004, under preparation.