Plans for the Vienna VLBI Software VieVS

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Motivation

We have been using and developing Occam. However, we found that ..
Motivation

• Occam has become unnecessarily complex, e.g.
  – obsolete models (e.g. equinox based transformation)
  – many functional models for estimated parameters
• Occam does not fulfill modern requirements, e.g.
  – zenith wet delays at integer hours
• Our students are not familiar with Fortran but they are experts in Matlab
Why Matlab?

• Many of our students would write bachelor-, master-, or ph.d.-theses about VLBI-related topics if they could use Matlab
• Many built-in tools and functions, e.g.
  – netcdf readers and writers
  – matrix tools
• Plotting tools are very convenient
• etc.
Arguments against Matlab

• Matlab is a commercial software
  – Many institutes use Matlab
  – We can provide executables
  – There is a non-commercial counterpart Octave

• Matlab is slower than Fortran or C
  – Tests showed that this is not critical for our purposes
Concept

We do not start from scratch but ..
Occam to VieVS

**Occam**
- dttau0
- pn
- station
- geomet
- lsm

**VieVS**
- dttau0
- one common 'calc'
- lsm

*mostly done*
We throw away lots of things, e.g. we only use piecewise linear offsets at integer hours for the least-squares adjustment.

\[ x = \frac{(t - t_1)}{(t_2 - t_1)}(x_2 - x_1) \]
• Agreement with IERS Conventions
• Compatibility with VLBI2010 requirements
• Adoption of IVS WG4 data formats
  – presumably netcdf
  – exchange of provision of results
VieVS and related tasks

• **VLBI2010**
  – continue Monte-Carlo simulation studies
  – add a Kalman Filter solution

• **SCHED2010**
  – attach a new scheduling software to VieVS

• **Turbulence theory**
  – explore new parameterizations / stochastic models

• **Global solutions**
• NICT works on own space geodetic software (GNSS, SLR and VLBI)
• Based on Python, bindings to C/C++
• Co-operation with VUT to utilize experience gained from OCCAM and VieVS
• Share experience of NICT concerning amb. resolution, phase solution
• Work together on space-craft tracking and Space VLBI
NICT and VieVS

Software correlator
Ambiguity resolution
- group delays
- phase delays

New database
IVS WG4

Spacecraft tracking
space VLBI
phase solutions

VieVS
Fringe plot