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# Plans for the Vienna VLBI Software VieVS

J. Boehm
H. Spicakova
L. Plank          T. Hobiger
K. Teke           R. Ichikawa
A. Pany           Y. Koyama
J. Wresnik        T. Gotoh
S. Englich        T. Otsubo
H. Schuh          T. Kubooka

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19th European VLBI for Geodesy and
Astrometry Working Meeting

10th IVS Analysis
Workshop

IVS 10th Anniversary
Celebration

The International VLBI Service for
Geodesy and Astrometry

Laboratoire d'Astrophysique
de Bordeaux
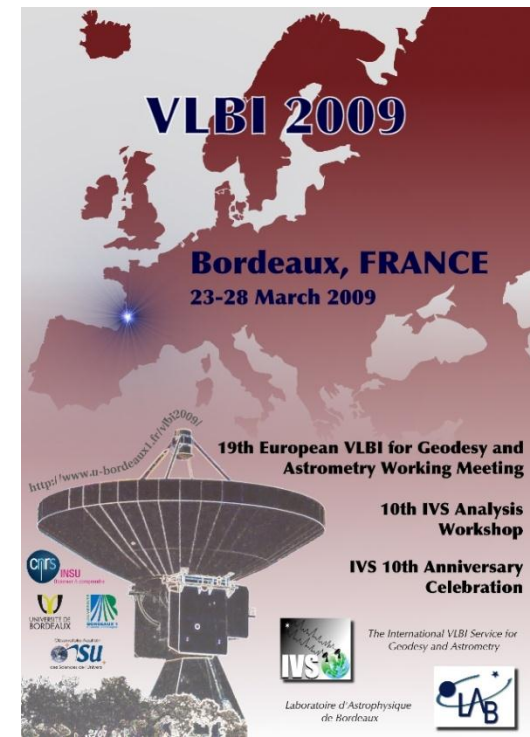
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# Motivation

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.
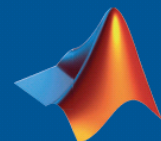
# Arguments against Matlab

- 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**

- dtau0  ⟹  **VieVS**
- pn
- station
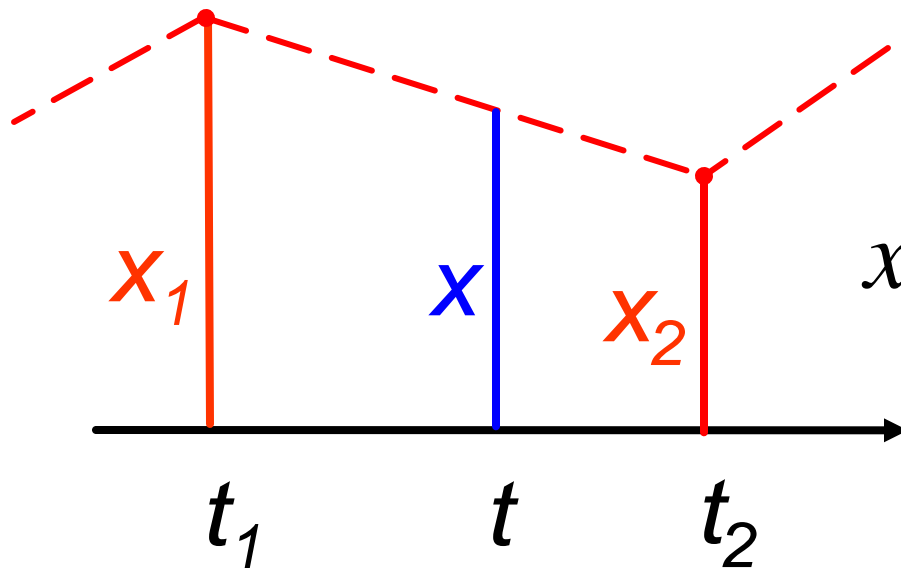- geomet
- lsm

**VieVS**

- dtau0
- one common 'calc'
- lsm    **mostly done**

# Occam to VieVS

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

$$x = \frac{\left(t - t_1\right)}{\left(t_2 - t_1\right)}\left(x_2 - x_1\right)$$

# VieVS

- 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
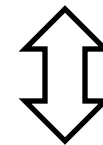
# NICT and VieVS

**Software correlator**

**Ambiguity resolution**

- group delays

- phase delays
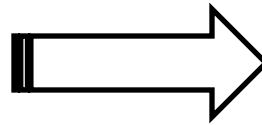
**New database**

**IVS WG4**

**Spacecraft tracking**

**space VLBI**

**phase solutions**

**VieVS**

# Fringe plot