

SCILAB

THE OTHER PACKAGE FOR NUMERICAL
COMPUTATIONS

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Claude Gomez

INRIA-Rocquencourt
Domaine de Voluceau - B.P. 105
78153 Le Chesnay Cedex
FRANCE

Claude.Gomez@inria.fr

Outline

1. What is Scilab?
2. History of Scilab
3. Problems
4. Future

What is Scilab?

Developed by INRIA and ENPC

Freely distributed with source code

<http://www.scilab.org>

newsgroup: comp.soft-sys.math.scilab

WORKS ON

- Most UNIX/X Window workstations: SUN Solaris, HP 9000, DEC alpha, SGI . . .
- **PC Linux**, Mac Linux
- **Windows 9X/NT/2000/XP**
- Port to Mac OS X under development

Scilab inside

- 265,000 lines of Fortran code
- 200,000 lines of C code
- 75,000 lines of Scilab code
- 45,000 lines of on-line help
- 25,000 lines of documentation
- Executable code: between 5 and 8 Mb
- Binary version: about 60 Mb

Standard functionalities

Matrix computations, high level language, well-suited syntax for matrices

- matrices, linear algebra, sparse matrices
- 2-D and 3-D graphics, animation
- polynomials and rational functions
- solving ODE (ODEPACK) and DAE systems (DASSL)
- Scicos: hybrid dynamic systems (similar to Simulink)
- classical control, robust control, LMI
- differentiable and non differentiable optimization
- signal processing
- Metanet: graphs and networks
- parallel Scilab (using PVM)
- statistics
- interface with Maple and MuPAD
- interface with TCL/TK
- and contributions from all around the world

A tool for development

Open system \implies possibility to adapt the software to (large) applications

Adding new functions:

- Scilab language, user defined functions
- C, C++, fortran, Java: automatic generation of interface, incremental link

Adding new types of object:

- using lists
- overloading operators

Scilab vs Computer Algebra

All computations are made with double precision floating point numbers

```
-->sin(%pi)
ans  =
    1.225E-16
-->a=[1 2;3 4]
a  =
!  1.    2.  !
!  3.    4.  !

-->a*a^(-1)
ans  =
!  1.          0.  !
!  4.441E-16  1.  !
```

The main data structure is the array of numbers

- It is easy to get C or Fortran programs making computations on vectors or matrices and put them into Scilab
- Free libraries: BLAS, LAPACK, Netlib ...

History

1980–1990

1980 Public domain version of Matlab by Cleve Moller
(2000 lines of Fortran code)

First interactive software for numerical computations on
matrices

Beginning of BLAISE software at INRIA

1984 Matlab has a number of sons: MATRIXx,
CONTROLc, PC-Matlab
and BASILE (INRIA) is commercialized by Simulog

1990–1994

- The free part of BASILE becomes SCILAB developed by the Scilab Group (6 people) at INRIA and ENPC
- Beginning of 1994: Scilab is a free open source software put on INRIA ftp site
- Other free softwares: Octave, Rlab

1994–2002

- Matlab/Simulink is the standard and a monopoly: big market
- Scilab becomes a full purpose numerical software

Scilab is a success

- 10,000 downloads of Scilab from INRIA web site
- Books, articles in French and English
- International community of users: contributions, India, China (Scilab Contest)
- Applications including Scilab: MuPAD, Metalido (EDF)
- R & D French and European programs
- Start-up: Saphir Control
- French Mathematics agregation, CDROM INRIA/CNDP

Why is Scilab a success?

- Matlab is a monopoly and is very expensive
- Scilab is free: no tokens
- Full purpose softwares: high school to University, for Academics and Industrials, Super Calculator
- Scilab is nearly a professional product:
 - It comes with toolboxes included
 - Binaries versions are available for a lot of machines
 - It depends on very few libraries
 - Easy to install, to compile
 - Good service from Scilab@inria.fr

Problems

Weaknesses of Scilab

- The software:
 - IHM and GUI not enough friendly
 - On-line help to be re-made
- The development:
 - Process to make a new release very heavy
 - Not enough testing, bugs fixing
- The community:
 - No animation of the contributors
 - No conferences
 - Too many emails
- Scilab is not enough used by companies:
 - No visibility (Web site)
 - What is the future of Scilab?

The Scilab Group is not able to face the success

Idea: to use the community of contributors

But to organize the community demands **people** and **time**:

- Structure of development for integration of contributions
- To manage and valorize the contributors

Solution: to have a team for development and promotion of Scilab

But: who is going to pay?

Future

Creation of Scilab Consortium

Purpose of Consortium:

- To gather academics, companies and contributors for the development of Scilab, all around the world
- To ensure a strong visibility
- To ensure the future of Scilab
- To give financial resources
- To play the role of the architect of Scilab
- To manage the community of contributors

Structure of the Consortium

Members of the consortium:

- with fees: Companies, Academics
- without fee: contributors

Parts of the consortium:

- Executive Committee
- Scientific Committee
- Working Team:
 - Development: a major release every 2 years
 - Checking and testing
 - First level hot line
 - Scientific animation
 - Marketing and promotion

Scilab 2002–2006

Creation of the Consortium in 2002

The Consortium is hosted by INRIA

At least 10 people in the working team

Road map for 4 years



Scilab must be a Scientific Software for Numerical Computations:

- that is a reference for Academics and Industrials all around the world
- that is a favorite link between industrial needs and new scientific trends
- that relies upon a wide community of contributors
- that is an alternative or a complement to Matlab