INSTITUT NATIONAL DE RECHERCHE EN INFORMATIQUE ET EN AUTOMATIQUE

Project-Team Scilab

Equipe opérationnelle du consortium Scilab

Rocquencourt

THEME NUM

Activity Report

2006

Table of contents

1. Team

Head of project team
Claude Gomez [DR, Inria, HdR]

Administrative assistant
Martine Verneuille [AI, Inria]

Staff member
Serge Steer [DR, Inria, part time, HdR]

Technical staff
Farid Belahcene [left on November 30 2006]
Allan Cornet
Didier Halgand
Bruno Joffret [since November 2 2006]
Sylvestre Ledru [since June 15 2006]
Fabrice Leray [left January 31 2006]
Pierre Maréchal
Hugues Perdereau
Jean-Baptiste Silvy

Research scientist
Jacques-Deric Rouault [since September 1st 2005]

Student intern
Xu Huang [chinese student - march to june 2006]
Yao Liu [chinese student - july and august 2006]
Susumu Yagi [japanese student - october and november 2006]
Kaname Shimada [japanese student - october and november 2006]

Student extern
Arnaud Mangin [french student in the OASIS Project for Scilab grid toolbox- april to september 2006]

2. Overall Objectives

2.1. Overall Objectives

Scilab is a scientific software platform for numerical computation providing a powerful open computing environment for engineering and scientific applications.

Scilab is an open source software. Since 1994 it has been distributed freely along with the source code via the Internet. It is currently used in educational and industrial environments around the world. Scilab is produced by the Scilab Consortium, launched in May 2003. The Scilab Consortium has to date 25 members.

Scilab project is not a "research project" but a "development project" at INRIA-Rocquencourt. It is the operational team of Scilab Consortium.

Scilab includes hundreds of mathematical functions with the possibility to add interactively programs from various languages (Fortran, C, C++, ...). It has sophisticated data structures (including lists, polynomials, rational functions, linear systems...), an interpreter and a high level programming language.

Scilab has been conceived to be an open system where the user can define new data types and operations on these data types by overloading operators.

A number of toolboxes are available with the system:

- 2-D and 3-D graphics, animation.
- Linear algebra, sparse matrices.
- Polynomials and rational functions.
- Interpolation, approximation.
- Simulation: explicit and implicit systems of differential equations solvers.
- Scicos: hybrid dynamic systems modeler and simulator.
- Classic and robust control, LMI optimization.
- Differentiable and non-differentiable optimization.
- Signal processing.
- Graphs and networks.
- Parallel Scilab.
- Statistics.
- Interfaces with Computer Algebra (Maple).
- Interface with Fortran, Tcl/Tk, C, C++, java, LabVIEW.

A great number of contributions for various domains are available from Scilab Web site.

Scilab works on most UNIX systems including GNU/Linux and on Windows 9X/2000/XP/Vista. Binary versions for these systems are freely available, along with source code.

Web Site

Newsgroup: `comp.soft-sys.math.scilab`

Contact: `Scilab@inria.fr`

3. Scientific Foundations

3.1. Scilab Consortium

Scilab Consortium was created in May 2003. Today there are 25 members: ANAGRAM TECHNOLOGIES, APPEDGE, ARTENUM, ATMEL ROMA, AXS INGENIERIE, CEA, CNES, CRIL TECHNOLOGY, DAS-SAULT AVIATION, ECOLE CENTRALE DE PARIS, ECOLE POLYTECHNIQUE, EADS, EDF, ENPC, ESTEREL TECHNOLOGIES, IFP, INRIA, KLIPPEL, MANDRIVA, PSA PEUGEOT CITROèN, RENAULT, SCALEO CHIP, STYREL TECHNOLOGIES, THALES and TNI.

There are also 7 contributor members: they are natural persons who made important contributions to Scilab and who were accepted by the steering committee of the consortium.

The purpose of Scilab Consortium is:

- To organize cooperation and exchange within the community of developers in order to make Scilab a platform which integrates the latest scientific advances in the field of numerical computation.
- To organize cooperation and exchange within the community of users in order to make Scilab a product that meets specifications required for use in industrial, educational and research environments.
- To obtain the resources necessary to maintain a team committed to editing new versions of the software which meets specified standards, encouraging the community of developers and ensuring first level support for users.

The Consortium is chaired by Doctor Maurice Robin.

The main parts of the Consortium are:

- The *Conference of Participants* elects the persons taking part to the Steering Committee and to the Scientific Board and decides any other matter proposed for the agenda by the Steering Committee. The participants can take part to working groups. The purpose of working groups is to help and prepare the decisions of the steering committee. Currently there are working groups about Scicos and about Scilab kernel.

- The *Steering Committee* is the decision-making body representing the Consortium's Conference of Participants.

- The *Scientific Board* analyses the scientific value of contributions and previews the scientific value of developments to be carried out.

- The *Operational Team* described below.

3.2. Operational Team

The Operational Team implements the decisions of the Consortium about Scilab development and promotion. It is the "Scilab development project" at INRIA-Rocquencourt.

The team is organized as follows:

- The Chief Technology Officer of Scilab Consortium who manages the operational team: Claude Gomez.

- The Promotion and Marketing Manager who is responsible for promoting the software, recruiting new members, conducting communications and promotional activities and communicating the users'needs: Didier Halgand.

- The Scientific Manager who is in charge of the scientific parts of the project: Serge Steer.

- The Quality Assurance Manager who monitors and enhances quality assurance processes used in development and maintenance of Scilab: Hugues Perdereau.

- The Development Manager who coordinates the Development Team: Allan Cornet.

  The Development Team, tasked with developing or delegating the development of new functions or enhancement of existing features and to compile and distribute subsequent versions of the Scilab software. It does also maintenance and support. At the end of 2006 it is compound by:

    – Bruno Joffret.
    – Pierre Maréchal.
    – Sylvestre Ledru.
    – Jean-Baptiste Silvy.

3.3. Scilab Developers

They are people who can modify Scilab code directly, add functionalities and fix bugs. They work in accordance with Scilab team, under the management of the development manager.

There are currently 16 Scilab developers.

4. Software

4.1. New Scilab release

First of all, Scilab 4.0 was released in February 2006. The major changes from Scilab 3.0 to Scilab 4.0 are:

- Graphics:
  - Graphical entities (objects) have been extended with a particular effort on Axes, 3-D objects merge and zoom, rotation.
  - New functions have been defined to mimic their Matlab equivalent (plot, surf, mesh, bar, barh, barhomogenize, pie).
  - Graphical environment improved and extended.
  - Graphic window events handling (mouse, keyboard,...) have been improved and extended.

- Numerical computation:
  - Sparse operations and functions like real, imag, matrix, spones revisited to improve efficiency.
  - Bessel functions extended to work in the complex case (using Slatec routines).
  - New version of linpro and quapro.
  - BvodeS function added to solve differential equation with boundary value.
  - Detrend function added to remove constant, linear or piecewise linear trend from a vector.

- Scipad editor:
  - A debugging tool is now available.
  - Drag'n'drop is now supported.
  - Scipad is easily localized.
  - User settings and text colors are now configurable and saved across editing sessions.
  - Creation of XML help page templates and xmltohtml compilation available from within Scipad.

- Others improvement:
  - Use tcltk 8.4.13 - TCL interface has been totally rewritten (for better error detection and better data transfert). ScilabEval has been improved to handle synchronism.
  - Java interface written to allow calling Scilab computational engine from Java.
  - Try-catch instruction added to improve programming with error control.

As mentionned in the Scilab roadmap, the first release candidate of Scilab 4.1 was issued in November 2006, and the final release was available mi-December 2006. This new Scilab release is a minor Scilab release. The main work of this release is the correction of many bugs (266 bugs).

4.2. Scilab Development

The Scilab developement is based on a management plan and a quality policy. We describe below :

- The management plan.
- The quality assurance plan.
- The bug tracking policy.
- The qualification procedure and the qualification environment.

The management plan A management plan has been written and diffused to the Steering Committee of the Consortium. This document gives the general rules that the operational team sets up for the realization of the development of Scilab software within Consortium framework.

- Operational organization and regular check (team organization, responsabilities, meetings, etc.).
- Road map proposal (calendar and dead-line).

The quality assurance plan This document gives the general rules that the operational team sets up for the management, the development, the qualification, the diffusion and the maintenance of Scilab software.

- Quality plan (organization and follow-up).
- Cross procedures to the Scilab activity (documentation management and configuration management).
- Qualification procedure (process, referential, non-regression and implementation).
- Management procedure of the technical requests (bugs management, means, etc.).

The bug tracking policy The choosen policy is to have a complete tracability of all the Scilab bugs and requests. In order to respect the policy, an open source tool (Bugzilla) has been modified and installed to manage and track the Scilab bugs and the Scilab requests (see below the description of the bug tracking system).

The qualification procedure and the qualification environment Scilab team has defined and installed a qualification procedure and related environment to ensure the internal acceptance of the scilab software.

This procedure is based upon a reference scale of qualification. Each step of this scale is composed of critical elements and information elements:

- critical elements generally correspond to tests which must be successfully passed to achieve acceptance,
- information elements correspond to others tests, documentation checking, etc.

This provides not only criteria for classical acceptance but also thorough information on the final state of the scilab product version to be described in "released notes" document as well as known by support team prior to external delivery.

The used methodology should be an answer to the constraint of a software product:

- large diffusion
- heterogenous target machines
- regular delivery (major or minor releases)

4.3. Technical support

- Technical support daily activities
    - Answering emails coming from Scilab users and forwarding the emails to the Scilab experts in case of specialized problem.
    - Filtering and deleting spam emails by using procmail software.
    - Managing the bugzilla system and the database.
    - Administrating the Subversion server (SVN tool replaces CVS tool used before), managing the users, and access.
- Automatic compilation chain

    To test every day the compilation of Scilab sources provided by our Subversion server, an automatic compilation chain has been installed. It starts every night on various platforms (GNU/Linux, Windows, Solaris and HP UX).

    This compilation chain has three main tasks:
    - Compile Scilab SVN sources.
    - Produce a daily version of scilab on differents platforms and differents branches of SVN tree.
    - Launch various test batteries.

    This process is very important for debugging Scilab when source code is modified. Moreover it allows the team to release such called "nightly builds" every day: theses versions are not fully qualified but they allow the users to benefit from the last developments and bugs fixing.
- Scilab Website
    - Scilab website www.scilab.org is updated regularly. This web site is also a good pathway to be in contact and get feedback from scilab users. So, a guestbook and a form permit internet surfers to make requests. A web site traffic analysis and statistics tool has been installed. More than 50 thousand different net surfers visit each month www.scilab.org and scilab has been downloaded 210,000 times this year from the website.

- Scilab Intranet
    - We increase and update regularly our intranet website to share and give technical data and general information to the whole Scilab team.

- Bugzilla: a bug tracking system for Scilab In addition to the Scilab newsgroup, providing a wealthy Scilab software knowledge database, the Scilab development team proposes on Scilab website the Scilab bugs tracking system, a bugzilla-based system. It is a centralized web-database tracking system for Scilab bugs and Scilab requests. This tool allows to share and take advantage of the experiment of the Scilab community (developers and users). Each user, after creating an account, can:
    - create a new bug report or a new request,
    - give an attached file reproducing the defect and/or advising a workaround,
    - make a search in the bugs database or requests database,
    - find an existing patch for a registered bug.

+ Scilab developers Subversion source code and Bugzilla management has been open to the Scilab Developers. Decicaded Web pages have been made for them with all the information needed for coordinating the development. Now, this area is a real collaborative development environment: it provides a front-end to a range of software development lifecycle services and integrates with a number of open-sources applications:

    - forum: phpBB,
    - wiki: MoinMoin,
    - Subversion repository Viewer: ViewVC,
    - bug Tracking: Bugzilla.

4.4. Scilab step by step

Concerning Scilab, there already exists a documentation integrated in the language environment or directly loadable on web site, with introduction and presentation texts. Here, the purpose is not to do again in a better or worse way what is elsewhere done, but to present a different and original approach, which is qualified as step-by-step. This approach is directed as well to the beginner in computer sciences, to the begginer in Scilab as well as to confirmed programmers who are looking for a piece of information about syntax or a feature of the language.

This documentation is bilingual: English and French languages.

For each notion or element of syntax, this document presents one or several complete and runnable Scilab programs, completed by several images of the result at screen.

The programs are tested under both operating systems Windows and GNU/Linux.

Scilab step-by-step is structured into 7 volumes with a number of chapters for Scilab 3.0, 3.1.1 and 4.0:

Volume 0 Generalities.

Volume 1 Instructions and elementary types.

Volume 2 Structured types.

Volume 3 Procedures and functions.

Volume 4 Graphism.

Volume 5 Mathematics.

Volume 6 Probability and statistics.

The actual documentation represents about 2300 files (160 HTML files, 1840 JPEG figures, much more than 342 Scilab files). The Volume 6 is not yet written.

This year was dedicated to the functionnalities and use of the new graphics. In the new 4.0 version dedicated to Scilab 4.0, the accent is firstly put on the downloading/installation/test processes (Volume 0 – achieved) and on the functionnalities and use of the new graphics (Volume 4 – in progress).

This documentation is available at the websites:

- HTML and ZIP formats
- HTML and ZIP formats
- ZIP format

4.5. Windows Version

- Memory improvements under Windows platforms (particularly the management of virtual memory or swap file).
- Exception management added under Windows version.
- Windows platforms built with: Intel C and Fortran Compilers 9.1.
- The Windows binary version provided on our Web site is built with .NET 2003
- Improvement of the integration of Visual Studio Compiler to the dynamic links: findmsvccompiler() and configure_msvc() macros have been added.
- Integration of the ATLAS library (specific Windows version). During the installation of Scilab, dynamic library (Atlas.dll) is automatically chosen according to the CPU detected. See details in the Atlas.spec file under scilab directory.

4.6. Linux Version

- Configure adapted to linux 64 bit architectures.
- New compilation system under GNU/Linux and Unix : The Scilab compilation process under Unix and Unix like platforms was old and outdated. For each architecture and compiler, an important work was needed to investigate options and flags in order to produce binaries and libraries of Scilab. Thanks to the autotools (automake, autoconf and libtool), those problems are automaticaly managed and the maintenance is considerably simplified. We rewrited all the compilation process of Scilab with the latest technics available.

4.7. New Object Oriented Graphics

Even if Scilab 2.7 graphics was quite powerful, users complained in particular about the graphics functions syntax and the poor customization tools available. The conception of this graphics did not allow to make it evolve enough. A new entity oriented graphics has been built. To ensure backward compatibility the old graphic has been maintained until the 4.1 release.

In the new mode (enabled by default since version 3.0), each graphics window and the drawing it contains are represented by hierarchical entities. The hierarchy top level is the "Figure". Each Figure defines at least one child of type "Axes". Each Axes entity contains a set of leaf entities which are the basic graphics objects like Polylines, Rectangles, Arcs, Segs,...It can also contain "Compound" entities which are recursive sets of entities.

Graphics entities are associated to Scilab variables of type "handle". The handle is a unique identifier which is associated to an instance of an entity. Using this handle, it is possible to control the properties of the entities using the "set" and "get" functions. The handles are also used to manipulate graphics objects, to move them, to make copies or delete them. The main interest of the new graphics mode is to make property change easier and to avoid cumbersome list of arguments in the graphics function calling sequence to set the properties.

This year, work was mainly devoted to the debug of the graphics module for both the 4.0 and 4.1 releases. Since they are the two last versions before Scilab 5.0 and its deep modifications, work was focused on providing a very stable one. Consequently, around 200 bugs were fixed this year from our bug tracker. At the same time, on the other development branch, the module was prepared to receive the 5.0 new technologies and improvements. First of all, as any Scilab module, it was reorganized as an almost independent and maintainable module. It was also cleaned up from obsolete code to begin development on safe bases. In particular, the old graphic mode was removed after 4 years of cohabitation with the new one.

Concerning the new features on the development branch, we may notice the rewriting of text objects display which can now handle more complex strings. Some additional functions to manage the graphics hierarchy more efficiently were added. A few missing graphics object properties were also added.

4.8. Matlab To Scilab Conversion Toolbox

The objective of this work is to provide a tool to ease the translation of Matlab toolboxes for Scilab. Due to their common origin, Scilab and Matlab have a lot of similarities, but Scilab and Matlab have evolved separately making the translation from one language to the other difficult. In particular variable properties inference is mandatory to be able to produce a readable and efficient code.

Jointly to this work, a dictionary of Matlab and Scilab equivalents is written based on our precise knowledge of both tools. This document is available on Scilab Web site.

During this year the following works have been done:

- The improvement of the toolbox translation tool to allow inter-function variable properties inference.
- Much more Matlab functions are now known by the translator.
- The documentation and the test set have been extended and real size tests have also been made with the help of Scilab Consortium members
- Subfunction handling has been improved.
- The generated code readability and efficiency has been improved.

4.9. Reorganization and modularity

Reorganization and cleaning of the code for Scilab 5.x started.

- Reorganization and modularity:
  - To allow independent development of each Scilab components together with improvement and fixing via patches.
  - To give a genuine interoperability to the Scilab kernel and components from external programs and modules.

- Implementation of dynamic libraries:
  - To ease improvement and fixing via patches.

- First step of localization:
  - To allow easy change of menus and messages languages. Preparation to the localization has already be done. A database of strings and C format has been developed, with the corresponding query mechanism and scilab functions to get strings out of the database. New procedures for error messages and warnings have been developed and the old error and warn procedures has been adapted to use the database.

4.10. European projet : hArtes

Scilab takes part in a new European project named "hArtes" funded by FP6 call5 Embedded Systems. hArtes aims to lay the foundation for a new holistic (end-to-end) approach for complex real-time embedded system design, with the latest algorithm exploration tools and reconfigurable hardware technologies. The proposed approach will address, for the first time, optimal and rapid design of embedded systems from high-level descriptions, targeting a combination of embedded processors, digital signal processing and reconfigurable hardware.

hArtes will develop modular and scalable hardware platforms that can be reused and re-targeted by the tool chain to produce optimized real-time embedded products. The results will be evaluated using advanced audio and video systems that support next-generation communication and entertainment facilities, such as immersive audio and mobile video processing.

Scilab will be used as an input of this chain as high level algorithm description language. For this purpose we are going to generate C code from scilab scripts.

For the time being, we only had a Kick-off meeting in order to clearly specify hArtes needs, and define the role Scilab is going to play in it.

Scilab to C code generator [sci2C]:

The aim of this toolbox is to allow users generate their own standalone C Code from Scilab scripts. The C code will be generated for General Purpose Processors but will enlarge in order to fit specific processors like DSP used in hArtes.

The aim is to generated minimal standalone C code that only include libraries it really needs. Then this code will be able to be executed independently of Scilab or embedded in processors, giving independance and efficiency. This is a major improvement for Numerical Computation Packages.

4.11. Other Developments and Support

- Connecting LabVIEW with Scilab.
  - The gateway contains an early release of a software interface [Beta version] that you can use to call Scilab from LabVIEW

- Licence investigations:

– Scilab is a patchwork of various scientific/IT works. During the last few years, free and open-sources software are becoming more and more important. As licences are one of the key of this revolution, it is crutial to have a clear vision of Scilab embedded sources. Each file has been inspected and the licence evaluated. When the licence was not INRIA, an evaluation of the compatibility of the licence has been made.

4.12. Marketing

In 2006, in line with the mission of the function, the marketing activity aimed at developing the software publishing activity of the Consortium according to the market demand.

To that end and in accordance with the received directives, the accomplished efforts aimed, more particularly, at:

- Defining and implementing relevant business practises,
- Increasing Scilab awareness and notoriety both locally and internationally,
- Increasing the number of both the Scilab Consortium members and the Scilab users,
- Identifying and formalizing needed partnerships,
- Positioning Scilab as a privileged numerical calculation platform for some targeted national and European significant projects,
- Proposing an implementation plan for the strengthened Scilab organization planned to be set up by end of 2007.

Major quantitative achievements:

- The Scilab Consortium increased in 2006 from 20 to 25 members,
- The number of downloads increased also steadily to reach a monthly average of more than 20,000 (23,772 in October),
- Scilab has been exhibited at 5 major national and international events,
- 15 formal presentations of Scilab to large organizations or companies have been delivered,
- Numerous business meetings took place with potential consortium members and users to sustain Scilab Consortium growth and increase Scilab awareness and use,

Major qualitative achievements:

- An agreement has been finalized with National Instruments to jointly produce a Scilab/LabVIEW gateway which should increase a lot the Scilab?s adoption and pave the way for additional areas of collaboration, the development of high value toolboxes and the extension of Scilab use in the USA and worldwide, not to mention the creation of a Scilab Consortium representation in North America,
- A fruitful collaboration has been initiated with MANDRIVA which should reinforced Scilab positioning among the Linux community,
- Scilab has been selected by the French Ministry of Equipment as the recommended calculation platform for the Eurocodes (European unified civil engineering calculation tools),
- A first portfolio of services dedicated to Scilab has been defined jointly with and implemented through Scilab Consortium member STYREL,
- Scilab Web site reshaping has been initiated. The site represents today a real asset on which it is planned to capitalize,
- The plan for a reinforced Scilab operation has been submitted to the Consortium Steering Committee on May 18 and adopted. Similarly the plan has been presented to the Assembly of Participants on July 3. It is currently worked out with the support of INRIA Transfert. New organization is planned to be set up end of 2007,
- Very positive initial talks with the University of Coventry and its industrials partners. They should rapidly lead to a Scilab reinforced presence in the UK, particularly in the automotive and research domains. In the medium run, they could additionally lead to the creation of a Consortium local representation in line with what is anticipated in the Consortium development plan.

5. Contracts and Grants with Industry

5.1. Scilab Consortium

After INRIA funding, the main funding of Scilab project comes from the dues given by the members who subscribe to Scilab Consortium.

The team has also a funding from the French Embassy in Beijing for the promotion of Scilab in China.

6. Other Grants and Activities

6.1. Consortium

- Claude Gomez: steering committee, 18 January 2006.
- Claude Gomez and Didier Halgand: steering committee, 18 May 2006.
- Claude Gomez and Didier Halgand: assembly of Consortium participants, 3 July 2006.
- Claude Gomez: steering committee, 11 October 2006.

6.2. National Actions

- Stand at the Salon Solutions Linux 2006, Paris, 31 January–2 February 2006.
- Stand at the 2006 NI days, Paris, 2 February 2006.
- Invitation by National Instrument to the "Forum Automobile", Paris, 8 June 2006.
- Stand at "Paris capitale du libre", Paris, 26 June 2006.
- Stand at the "Forum Aronautique, Spatial et Dfense", Toulouse, 28 September 2006.
- Stand at the CCA/CACSD/ISIC, Munich, Germany, October 2006.
- Stand at the 45th IEEE Conference on Decision and Control ? CDC ?06, San Diego, USA, 13–15 December 2006.

We participated to 2 proposals that were accepted by the RNTL.

- OMD project, about multidisciplinary optimization, is based on Scilab platform. It will provide Scilab with a number of toolboxes for optimization. See http://omd.lri.fr.
- SCOS project, first generic Open Source platform for the global conception of complex systems has just be launched. Scilab is the numerical computation software used for this platform. See http://www.oscos.org/.

6.3. European Actions

We participated to the hArtes project funded by FP6 call5 Embedded Systems. See above.

6.4. Numerical Mathematics Consortium

The creation of the "Numerical Mathematics Consortium" or NMC was announced In August 2005 in Austin (USA): NMC. INRIA, hosting Scilab Consortium, is one of the founding members with Maplesoft, National Instruments and PTC (formerly Mathsoft). The purpose of this consortium, open to everybody and working in the same way as the W3C, is the definition of the semantics of a set of mathematical functions for making numerical algorithms, mainly for matrix computations. The implementation of the algorithms is not taken into account and the syntax of the functions, only used for examples, is not imposed. The standardization should allow the interoperability of the software and the easy re-use of numerical algorithms. Standardization is one of the missions of INRIA who is strongly involved in the consortium.

We participate to the writing of the technical document: Revised Specification Addresses New Functions and Lays Foundation for Active Involvement (2 october 2006).

6.5. International Actions

- Claude Gomez: 2006 Scilab Contest Awards Ceremony, Tokyo, Japan, 5-6 June 2006.
- Claude Gomez, Serge Steer: 2006 Scilab Contest Awards Ceremony, HangZhou, China, 27 September 2006.
- Stand at the 45th IEEE Conference on Decision & Control, San Diego (California USA), 12–15 December 2006.

6.6. Visiting Scientists

Winners of 2006 Scilab Contest: 5 Chinese professors and 5 Chinese students, 27 November – 1 December 2006.

7. Dissemination

7.1. Scientific Committee Activities

- Claude Gomez: member of the executive committee of RNTL.
- Claude Gomez: co-organizer of the 2006 International Workshop on Open Source Software. SCILAB and its Engineering Applications (OSSS-EA'06), HangZhou (China), September 28–29, 2006.

7.2. University Teaching

- Claude Gomez
  - Ecole Centrale de Paris, third year: Dynamical Systems.
  - Chaire X-THALES "Ingénierie des Systèmes Industriels Complexes": Dynamical Systems.
- Serge Steer
  - Chaire X-THALES "Ingénierie des Systèmes Industriels Complexes": Dynamical Systems.

7.3. Examination

- Claude Gomez: member of the board of examiners of "Agrégation de mathématiques" in Morocco organized with the help of French Ministry of Education and French Foreign Affairs.
- Claude Gomez: member of the board of examiners of "Olympiades de mathématiques de l'Académie de Versailles"

7.4. Conference and workshop committees, invited conferences

- Claude Gomez Les logiciels de calcul et le calcul numérique avec Scilab. Séminaire de la chaire X-THALES, 20 février 2006.
- Claude Gomez Scilab, la plate forme "open source" pour le calcul numérique. Colloque calcul scientifique, ENS Cachan, 28 février 2006.

- Claude Gomez Scilab, the open source platform for numerical computation. Workshop on engineering tools for space environments and effects analyses, Toulouse, 30-31 mai 2006.

- Didier Halgand Scilab, the Open Source Platform for Numerical Computation. Harmonisation Workshop on Modelling and Simulation Tools, ESA- ESTEC, Holland, 9 June 2006.

- Claude Gomez Familiarisation à Scilab pour le lycée Exemples d'utilisation de Scilab en classes de mathématiques du secondaire. Disponibles à l'adresse http://www.scilab.org/lycee, September 2006.

- Farid Belhacen, Serge Steer Tools for building Scilab toolboxes, present and future 2006 international workshop on Open Source Software Scilab and its Engineering Applications OSSS-EA'06, Hangzhou China, 28–29 September 2006

- Didier Halgand Scilab at a glance / Example of implementation at CNES. 3rd International Workshop on Astrodynamics Tools and Techniques, ESA- ESTEC, Holland, 4 October 2006.

- Didier Halgand Scilab, la Plateforme Open Source de Calcul Numérique et son interface avec LabVIEW. Seminaire Traitement de l'Image, Polytech' Orléans / Cresitt, Orléans, 22 November 2006.