

XMLlab Toolbox for Scilab, version 1.7.6

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1 Introduction

XMLlab is an XML-based simulation authoring environment. The proposed description language allows to describe mathematical objects such as systems of ordinary differential equations, systems of non-linear equations, partial differential equations in two dimensions, or simple curves and surfaces. It also allows to describe the parameters on which these objects depend. This language is independent of the software and allows to ensure a relative perennity of authors work, as well as collaborative work and content reuse.

A complete documentation is also available at the XMLlab's web site at the url

<http://xmlab.org/documentation.html>.

1.1 Authors and Credits

XMLlab is developed by Stéphane Mottelet and André Pauss (currently both with the University of Compiègne).

Please use the address `mottelet@utc.fr` to send questions or bug reports.

1.2 Licensing

XMLlab is copyright (C) 2001-2014 by S.Mottelet and A. Pauss and is distributed under the terms of the GNU General Public License (GPL).

In short, this means that everyone is free to use XMLlab and to redistribute it on a free basis. XMLlab is not in the public domain; it is copyrighted and there are restrictions on its distribution (see the file LICENSE). For example, you cannot integrate this version of XMLlab (in full or in parts) in any closed-source software you plan to distribute (commercially or not).

If you want to integrate XMLlab into a closed-source software, or want to sell a modified closed-source version of XMLlab, please contact us in person. You can purchase a version of XMLlab under a different license, with "no strings attached" (for example allowing you to take parts of XMLlab and integrate them into your own proprietary code).

1.3 A Brief request

If you use XMLlab, and especially if you use it to accomplish real work, we would like very much to hear from you. A short letter or email describing how you use XMLlab will mean a lot to us. The more people we know are using this program, the more easily we can justify spending time on improvements that we hope will benefit you.

Also, let us know if you want us to put you on a list to receive email whenever a new version of XMLlab is available. This is not a public list; you won't get email from anyone but us, and you won't get it often. No need to fear a full mailbox.

If you use a simulation generated by XMLlab in a publication, please include an acknowledgment as well.

2 Installation/Dependencies

Since the 1.7.4 version (1.74 with the original naming convention), XMLlab is available as an ATOMS package in Scilab. Therefore, the following instructions are relevant only for users wanting to install the software before the official packages are available on the ATOMS portal, or wanting to rebuild XMLlab.

2.1 Dependencies

Under all operating systems, If you don't already have Scilab, you will need to install it first. The required versions of Scilab are

Scilab version \geq 5.4.1

This version of XMLlab also relies on the plotlib 0.23, available at

<http://www.utc.fr/~mottelet/plotlib.html>

which will be soon available as an ATOMS package (at the time of writing this document the package has been uploaded but is not packaged yet). For future versions of XMLlab, we will work hard in order to suppress this dependency. The better way to install plotlib 0.23 is to use Scilab's command line :

```
-->atomsInstall(['plotlib', '0.23'])
```

If you get an error message saying that the package is not available, download `plotlib-0.23.zip` at the following url

<http://forge.scilab.org/index.php/p/plotlib/source/tree/HEAD/tags/0.23>

and then install it offline like this :

```
-->atomsInstall plotlib-0.23.zip
```

2.2 build and/or offline install of the XMLlab toolbox

You just have to unpack the XMLlab archive somewhere in your home directory, say `/home/dude/XMLlab` for instance, and then build the toolbox. Launch Scilab. In Scilab's command window, go to the installation folder

```
cd /home/dude/XMLlab
```

and execute the builder script

```
exec builder.sce
```

If you plan to use XMLlab only from Scilab's command window, jump to section 2.

2.2.1 User environment variables

If you want to be able to use xmlab from the shell command line, add the string (replace `Linux` by `Darwin` if you are using MacOSX)

```
export PATH=/home/dude/XMLlab/Linux/i686/bin:$PATH
```

in your `.profile` or `.bash_profile` (if you are using a bash shell), or

```
setenv PATH /home/dude/XMLlab/Linux/i686/bin:$PATH
```

in your `.cshrc` or `.tcshrc` (if you are using csh or tcsh).

3 Publishing feature

I did not have the time to document it further, type `help publish` at Scilab's prompt. The publishing feature is used to produce static websites allowing to deploy XMLlab files (an example is given in the examples tab in the xmlab.org site).

4 Helper application and packed .xmlab files

The command (at Scilab's or shell prompt)

```
pack file.xml
```

does the following : create a zip archive `file.xmlab` containing the xml file renamed to `content.xml` as well as any resource, image or script used by the simulation, see e.g. the files in the directory `XMLlab/examples/packed`.

These `.xmlab` files can be executed with the `xmlab` script as regular xml simulation files, e.g. try (from XMLlab directory)

```
xmlab -run examples/packed/clown.xmlab
```

The command `unpack file.xmlab` unzips the archive and renames on-the-fly `content.xml` to `file.xml`.

On every platform a binding between the `.xmlab` files and a helper script (`xmlab_helper`) is done at installation time, i.e. under Windows and MacOSX you can double-click on the icon of a `.xmlab` file and the simulation will be run. These bindings are also used in web pages or pdf files when links to `.xmlab` files are clicked.

Under Linux or SunOS, the mime type `application/x-xmllab` is added to the `.mime.types` file in your home directory and the `.mailcap` file is also modified.

For the moment there is no possibility to change the default xmllab command switches, i.e. when `clown.xmllab` is double-clicked then the command `xmllab_helper clown.xmllab` is issued, which unzips the archive, and runs the command

```
xmllab -run content.xml
```

There is no possibility to change the widget (plain or notebook) and the default language of the simulation is used. In the next XMLlab version version, all existing options, and many more, will be stored in a separate file `style.xml`, which will be side by side with `content.xml` in the archive.

If you have already installed XMLlab and read this file with Adobe Reader you can click [here](#) to launch the packed simulation located at

```
examples/packed/clown.xmllab
```

See the source file `install.tex` to see how to integrate your simulations in latex documents.

5 Web Server feature

5.1 Requirements

There are some basic requirements, which are checked when the XMLlab toolbox is built (when you run `XMLlab/builder.sce`), but the details depend on each platform:

- Scilab version $i= 5.4.1$
- A full (X11) Tcl/Tk install
- The Apache 2 Web server with the suexec feature enabled (not checked at installation time)

5.1.1 Linux (Redhat, Fedora, Debian, Ubuntu)

With a recent Linux distribution, the XMLlabServer installation should not be a hassle (tested on Ubuntu $i= 10.04$).

Tcl/Tk You need a full working Tcl/Tk library installed in a standard location. This is a standard package. If it is not already installed, you can find it in your installation CD's or in a repository.

Apache2 Configuration The Apache2 Web Server should be installed.

The suexec feature is not enabled by default. Under Debian or Ubuntu, you need to install the corresponding package

```
sudo apt-get install apache2-suexec
```

and then activate the module

```
sudo a2enmod suexec
```

Then some very basic configuration is required : you have to allow the execution of cgi scripts in a user folder of the kind `public_html/cgi-bin/`.

You need to add the following line in your `apache2.conf` file :

```
AddHandler cgi-script .cgi
```

The `userdir` feature is not enabled by default. Under Debian or Ubuntu, you need to activate the corresponding module

```
sudo a2enmod userdir
```

Then you need to allow the execution of cgi scripts in user folders: just add the "ExecCGI" keyword to the Options line in the UserDir section:

```
#  
# Control access to UserDir directories.  The following is an example  
# for a site where these directories are restricted to read-only.  
#
```

```
<Directory /home/*/public_html>  
    AllowOverride FileInfo AuthConfig Limit  
    Options MultiViews Indexes ExecCGI  
    <Limit GET POST OPTIONS>  
        Order allow,deny  
        Allow from all  
    </Limit>  
    <LimitExcept GET POST OPTIONS>  
        Order deny,allow  
        Deny from all  
    </LimitExcept>  
</Directory>
```

5.2 Testing the Installation

You can firstly verify if XMLlab is correctly working e.g. by running some simulations from the "XMLlab" menu. During the installation of XMLlab the folders

```
XMLlab/webserver/XMLlabServer  
XMLlab/webserver/cgi-bin
```

are copied in your `public_html` (or `Sites` under Darwin) folder in your home directory. To test the installation, we have created a default list which allows to serve the whole examples directory in your XMLlab directory. This list is described in a XML file located at

```
public_html/XMLlabServer/lists/examples.xml
```

You just have to open any web browser and type the URL (replace eventually localhost by the fully qualified name of your machine) :

```
http://127.0.0.1/~username/cgi-bin/XMLlabServer.cgi?list=examples.xml
```

6 Test

6.1 On Scilab's command line

```
-->chdir(%xmlab)
-->chdir examples/Physics
-->xmlab -run oscill
```

6.2 XMLlab menu

You can also use the XMLlab menu on the menu bar of the command window, and run the examples from the demo submenu.

7 Uninstallation

XMLlab is now installed as an ATOMS package, but since a post-install script writes some information (registry information under Windows, .mime.types and .mailcap under Unix/Linux) you have to select **Uninstall XMLlab** in the XMLlab menu in Scilab's command window.

8 Create and edit Simulation files

XMLlab is not distributed with an editor, this your job to find the editor that fits best your needs.

If you are able to figure out the authorized constructions by looking at the DTD file, then you don't need an XML editor, and a good text editor with syntax highlighting will be enough.

8.1 XMLMind XML Editor (XXE)

If you are not completely familiar with XML stuff, then you need a real XML editor. We recommend the XMLmind XML editor, which is available at no charge at <http://www.xmlmind.com>.

In order to make XXE aware of the XMLlab dtd, you must have a copy of the `XMLlab/catalog.xml` file in some precise location. This file is automatically copied there during the installation of XMLlab :

- **Windows XP/2000 :**

`C:\Documents and Settings\Username\XMLmind\XMLeditor\addon\config`

- **Unix/Linux/Darwin :**

`$HOME/.xxe/addon/config`

8.2 Scilab built-in editor

You can use the built-in Scilab editor, which is able to use syntax highlighting. Select **Edit a simulation** in the XMLlab menu.