GNU TeXmacs

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Software name: GNU TeXmacs

Short description:

- A structured scientific text editor.
- An interface to computer algebras systems.
- A free software, which is part of the GNU project.

Public access: `http://www.texmacs.org`

Abstract

GNU TeXmacs [vdH01, vdH02, Gro01] is a free software, which can both be used as a scientific text editor and as a front-end for computer algebra systems. The editor allows you to write structured documents via a wysiwyg (what-you-see-is-what-you-get) and user friendly interface. New styles may be created by the user. The program implements high-quality typesetting algorithms and TEX fonts, which allow the user to produce professionally looking documents.

The high typesetting quality still goes through for automatically generated formulas, which makes TeXmacs suitable as an interface for computer algebra systems, or other types of "plugins". Currently, there are interfaces with Axiom, Giac, GNUplot, Graphviz, Gtybalt, Macaulay2, Maxima, Mupad, GNU Octave, Pari, Qcl, GNU R, Reduce, Scilab and Yacas. TeXmacs also supports the Guile/Scheme extension language, so that you may customize the interface and write your own extensions to the editor.

In our demonstration, we plan to show briefly how to edit mathematical texts with TeXmacs, how to use computer algebra systems, and how to add interfaces with new systems in a very efficient way.

1 Description

The free software GNU TeXmacs [vdH01, vdH02, Gro01] has been developed for several reasons:

1. The need for a general purpose and user friendly scientific text editor.
2. The need for high quality front-ends for computer algebra systems.
3. The need for free (in the sense of freedom) scientific software.

As its name indicates, the program was inspired by TEX/LATEX for its typesetting quality and the possibility to write structured documents. The program was also inspired by GNU Emacs in the sense that it comes with an extension language, Guile Scheme, which allows the user to customize TeXmacs and even extend the editor. Nevertheless, TeXmacs is neither a TEX/LATEX front-end, nor an extension of Emacs.

From the editing point of view, TeXmacs has the advantage of being wysiwyg (what-you-see-is-what-you-get). This does not withstand the facts that TeXmacs is also a structured editor [vdH01] and that its typesetting quality is comparable to TEX. In fact, the user may control the degree of desired wysiwygness and the user may "feel" the structure of a document in other ways than through the explicit display of "source code". From the typesetting point of view, many algorithms were taken from TEX (hyphenation, line-breaking, spacing, etc.), as well as the fonts. At certain points, improvements were made, especially with regard to typesetting automatically generated formulas.

GNU TeXmacs can currently be used as an interface for many computer algebra systems and other scientific software: Axiom, Giac, GNUplot, Graphviz, Gtybalt, Macaulay2, Maxima, Mupad, GNU Octave, Pari, Qcl, GNU R, Reduce, Scilab and Yacas. Communication takes place using pipes or dynamic libraries and existing pretty printers for LATEX can be reused in order to build an interface with a new system in a few hours. At a second stage, a working interface can be extended to allow for two-dimensional mathematical input, tab-completion, contextual menus, customized keyboard modes, and much more.

Being part of the GNU project, one of the main aims of TeXmacs is to encourage the development of free computer algebra systems, by removing the burden of writing good user interfaces from the programmers. We believe that free programs in the sense of

`http://www.gnu.org/philosophy/free-sw.html`

are particularly important in science: which mathematician would accept a proof of a theorem contained in a black box, for which you do not have the legal right to open it? What is the scientific interest of a theorem which cannot be used in proofs of other theorems?

The TeXmacs program is still far from complete. Nevertheless, we do not know of any other programs which combine its three current strengths: its user-friendliness and wysiwygness, its interfacing capacities, and its freedom. At the moment, we are working on better conversions with TEX/LATEX and input/output filters for HTML/MathML. In the future, we plan to include a "universal spreadsheet", a technical drawing editor, and more structured editing facilities.

References

[Gro01] Andrey Grozin. TeXmacs interfaces to Maxima, Mupad and Reduce. Tech. rep., Arxiv, 2001. `http://arxiv.org/abs/cs.SC/0107036`.

[vdH01] Joris van der Hoeven. Gnu texmacs: A free, structured, wysiwyg and technical text editor. In Daniel Flipo, editor, *Le document au XXI-ième siècle*, volume 39–40, pages 39–50, Metz, 14–17 mai 2001. Actes du congrès GUTenberg.

[vdH02] Joris van der Hoeven. Gnu TeXmacs. `http://www.texmacs.org`, 1998–2002.