Maxima Code Status and Plans

http://maxima.sourceforge.net

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Maxima Project Leader

Overview

- **Disclaimer**
- **Some Macsyma/Maxima history**
- **The new project**
- **New features**
- **Longer-term release plans**
- **Interfaces**

Disclaimer


- **This presentation is about the nitty-gritty details of the Maxima implementation**
- **It is *not* a description of the mathematical capabilities of Maxima, or even the computational foundation of the program**
  - **I think there are many good things about both**
  - **I, and the others who work on Maxima, would not work on it as hard as we do if we did not think so!**
  - **I am leaving the mathematical presentation of Maxima to others...**

Some Macsyma/Maxima history


- **The original Macsyma project dates to the 1960's**
  - **Computer Science research project funded by the U.S. Department of Energy (DOE)**
- **The Macsyma source code was made available through a DOE program**
  - **There was a commercial version of Macsyma based on this code**
    - **Commercial Macsyma was recently unavailable**
    - **I have heard reports of new availability**
  - **A free version of this code was made available under the name Maxima**

William Schelter and Maxima


- The Maxima fork was made possible by William Schelter
  - Obtained code from DOE
  - Obtained formal approval from DOE for GPL distribution of Maxima
  - Maintained and developed Maxima for years
    - Also maintained and developed GCL, a Lisp implementation used by Maxima
- We owe professor Schelter a huge “Thank you”
- Tragically, William Schelter passed away in 2001

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October 6, 1998

William F. Schelter
Dept. of Mathematics
University of Texas
Austin TX, 78712

Dear Dr. Schelter:

RE: DOE-MACSYMA

This is in reply to your request of September 17, 1998, requesting a license to prepare and distribute derivative works from the copy of DOE-MACSYMA software obtained from the NESC. The ESTSC assumed the DOE Centralized Software Management Facility responsibility in January 1991. The following statement of the Department of Energy's (DOE) position is provided as the ESTSC response to your request.

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We have enclosed a current list of countries which are considered *sensitive* and require approval through DOE Headquarters. Should you have requests from such countries, please contact the ESTSC for approval. If you intend to make your derivative work(s) available under the GPL (gnu public license) via the Internet, the previous paragraph should be included in the GPL and should accompany other modifications, enhancements or derivative works of your program.

The derivative versions of DOE-MACSYMA which you develop for commercialization purposes may be of interest to the DOE organizations which ESTSC supports. We would appreciate getting copies of such derivatives and would adhere to the dissemination limitation markings which you define.

If you have questions or comments, please call me at 423/576-2606.

Sincerely,

Delores F. Brabson, Program Manager
Energy Science and Technology
Software Center

The new Maxima project


- The new Maxima project started in Fall 2001
  - http://maxima.sourceforge.net
- We have many contributors
  - I am not listing them only because I am afraid of leaving some of them out
  - Please see the mailing lists/cvs repository to see who is doing the work!
- The first release of the new Maxima project will be 5.9.0, a development release
  - The goal is a rock-solid Maxima 6.0

Focus for 5.9.0 – 6.0


- Few new user-visible features will be added before 6.0 is released
- The focus is on infrastructure
  - The one-man development model is efficient, but can lead to ideosyncracies
    - We are slowly eliminating these
  - Maxima build and install should be comfortable for people used to C and Unix
    - Autoconf and Automake
  - Maxima source development should be comfortable for Lisp experts
    - Defsystem

Lisp implementations before 5.9.0


- Previous Maxima versions worked primarily with GCL
  - Schelter maintained both
  - GCL does not implement the most recent Common Lisp standard, ANSI Common Lisp
  - Support for other Lisps exists in later versions
    - Not well documented
      - Completely different build system
    - Various ideosyncracies with non-GCL lisps

Lisp implementations now

- We now treat ANSI Common Lisp and GCL on equal footing
  - Current ANSI Lisps supported are Clisp and CMUCL
    - Ports to others should be easy
  - New GCL maintainers moving towards ANSI compliance
- Significant performance gains are possible with CMUCL
  - Extensive benchmarking has not yet been done

Code cleanliness...


- **...or lack thereof**
  - **Some of the code is *old***
    - **Conditionals (#+) for PDP10, etc.**
    - **Comments from 1970's**
  - **Roughly 1/3 of the source files were no longer in use**
- **It is getting much better**
  - **Build system is now understandable**
  - **Unused source file moved to archive directory**
  - **Will adopt consistent use of lower case in 5.9.1**
  - **etc.**

Other improvements



- New user manual
  - Work in progress
- Featureful command-line interface
- Possible to simultaneously install multiple versions
- Vastly improved numerical special function code for Bessel and related functions
- Emacs interfaces working with both Emacs and Xemacs
- I'm sure I'm forgetting some things...

Longer-term release plans

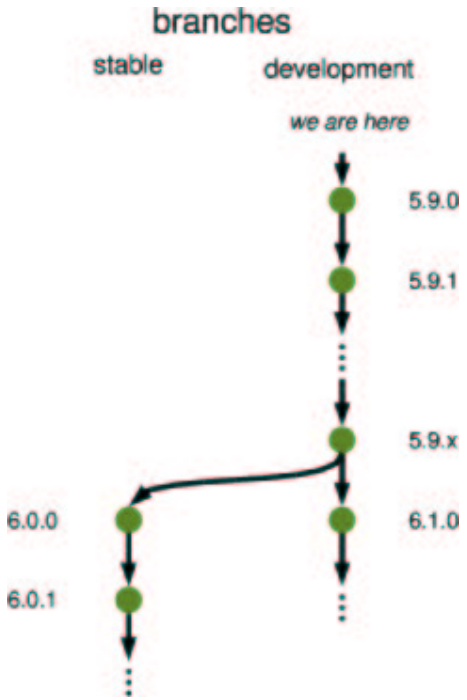
- What follows is a tentative plan for future releases of Maxima.
- Version numbering nomenclature: (major).(minor).(subminor)
- Development releases
  - Will have odd minor version numbers.
  - May be released with known bugs.
  - Interfaces may change between subminor releases.
  - Features may vary between subminor releases.

Longer-term release plans (2)

- **Stable releases**
  - **Will have even minor version numbers.**
  - **If at all possible, stable releases will have no known bugs when released.**
  - **Subminor releases will be released primarily for bug fixes.**

Longer-term release plans (3)

- **Details of planned releases can be found at**
  http://maxima.sourceforge.net/release-plans.html

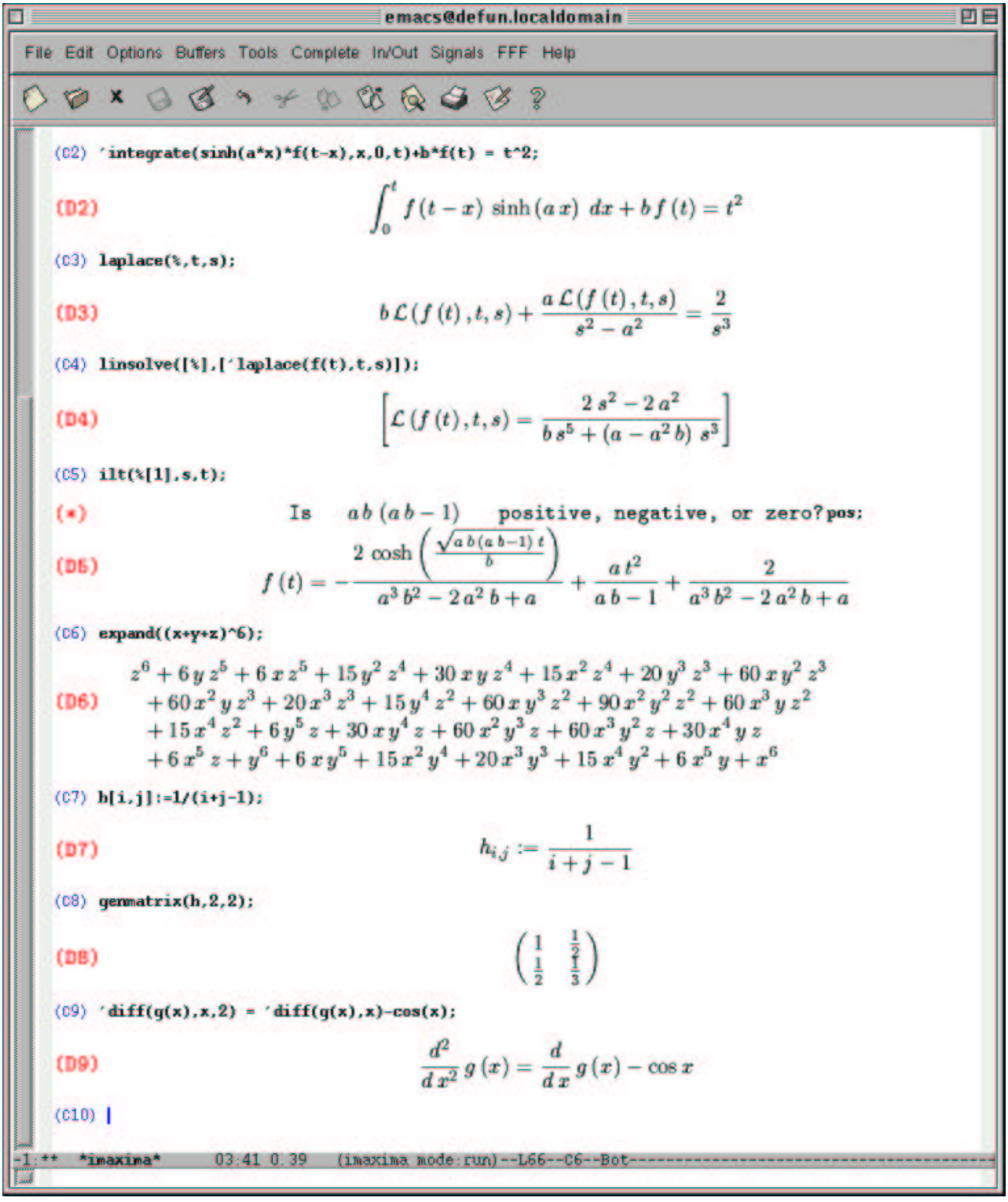


Command-line interface


- **Not that much to say about the command-line interface**
  - **GNU readline available when Maxima is compiled with Clisp or GCL >= 2.5.0**

(X)Emacs interfaces


- **(X)Emacs support for Maxima is newly improved**
  - **Maxima-mode with syntax highlighting, etc.**
  - **Ability to run maxima in a buffer**
  - **Imaxima**
    - **Run maxima in a buffer with TeX-formatted output**
      - **including line-breaking!**
  - **Emaxima**
    - **LaTeX documents with maxima output**

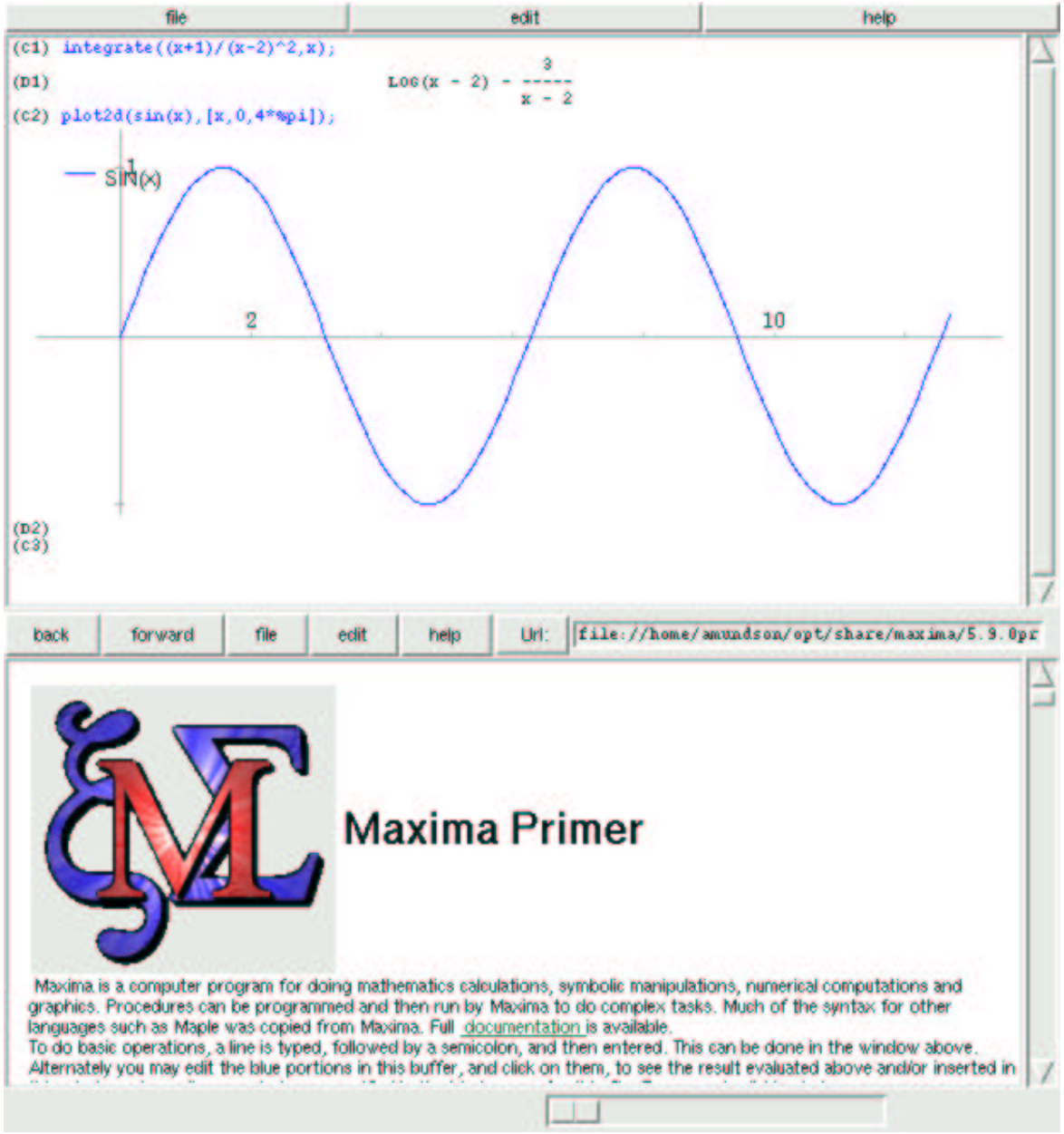


Imaxima screenshot

Xmaxima


- **Xmaxima is a TCL/TK application that acts as a front-end to Maxima**
  - **Works on Unix, Windows, MacOS (?)**
  - **Somewhat ideosyncratic**
    - **Time for discussion of the future of Maxima interfaces is set for after the 6.0 release**

Xmaxima screenshot



Conclusions


- **The new Maxima project is moving forward**
- **Maxima is a solid base for new work**
  - **We are currently improving the infrastructure**
  - **Mathematical improvements are next**
- **We owe a tremendous debt to William Schelter**