MathLibre: personalizable desktop environment for mathematics

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Introduction

MathLibre is a project to archive open source mathematical software and free mathematical documents and offer them on Live Linux system. MathLibre Project is the direct descendant of KNOPPIX/Math Project (cf. [1], [2]). It provides a desktop for mathematicians that can be set up easily and quickly.

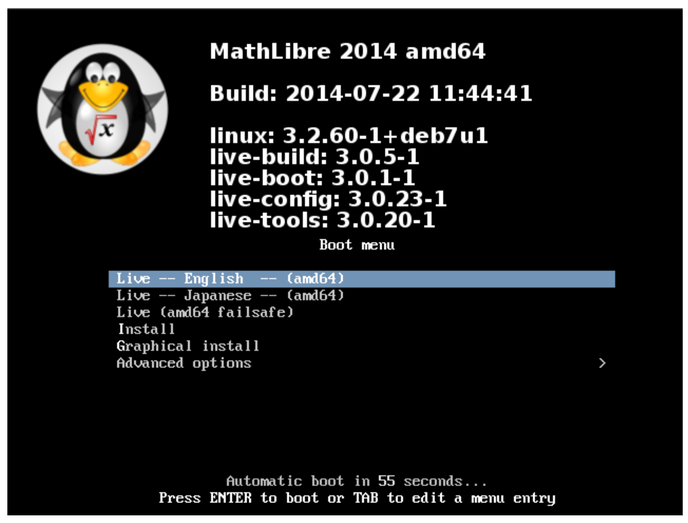

Figure 1: MathLibre desktop.

Our system includes TEX system and LATEX-editors, LibreOffice, Iceweasel(Mozilla Firefox), Chromium browser(Google Chrome), GNU Emacs. The DVD includes many mathematical software systems or libraries with documents, such as 3D-XplorMath-J, 4ti2, BLAS, Cadabra, C.a.R., cca, cddlib, CGAL, Coq, CoReLG, Dr. Geo, Eukleides, Euler, Fraqtive, FreeFem++, FreeMat GAP, genus2reduction, GeoGebra, Geomview, GEONExT, gfan, GNU R, GiNaC, GNU TeXmacs, Gnuplot, Kan/sm1, jReality, Kig, KSEG, Gappa, LAPACK, lcalc, LiE, lp_solve, Macaulay2, Mandelbulber, math-polyglot, Matita, Maxima, Normaliz, NumPY, NZMATH, Octave, OpenXM, PALP, PARI/GP, Perseus, PHAT, Polymake, ProofGeneral, Prover9, PSPP, QEPCAD, QFract, Reduce, Risa/Asir, rocs, SAGE, Scilab, Singular, skeleton, Sollya, SnapPea, SnapPy, surf, surfer, surfex, Surface Evolver, SYMPOW, XaoS, Yacas, and Yorick, . . .

How to run the live system (Windows machine or PC/AT compatibles)

This DVD contains a lot of documents and packages of mathematical software systems. Once you run the live system, you can experience a wonderful world of mathematical software systems without needing to make any installations yourself. This is a bootable DVD. If you can boot from the DVD, then please reboot. The live system will be ready.

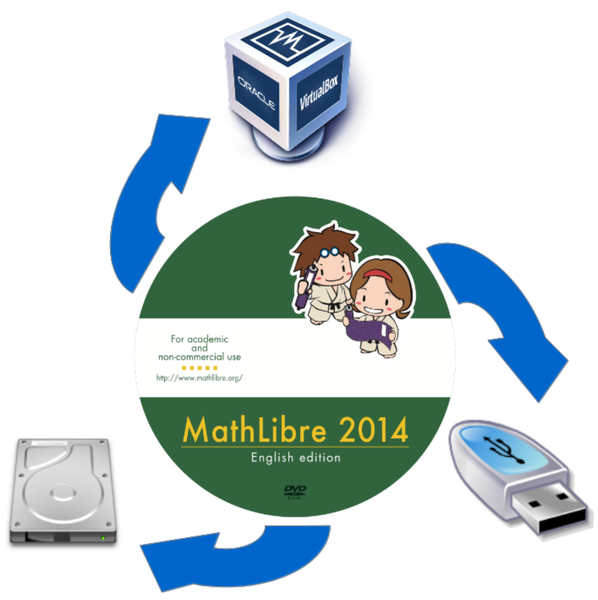

Figure 2: Ways of booting MathLibre.

If you prepare over 8GB USB flash drive, you can easily make USB bootable system with your home directory. In order to create a bootable USB flash drive, Please use the command "`mkusbmath`". The personal settings and additionally installed programs saved in the persistence partition. They are very convenient and useful systems for daily research use.

If your machine is not bootable, or has very special hardware devices which MathLibre cannot drive, we recommend you use virtualization software, "VirtualBox" or "VMware". The instructions for installing and using the virtual machine can be found in DVD and `http://www.math.kobe-u.ac.jp/vmkm/` .

Mathematical software systems

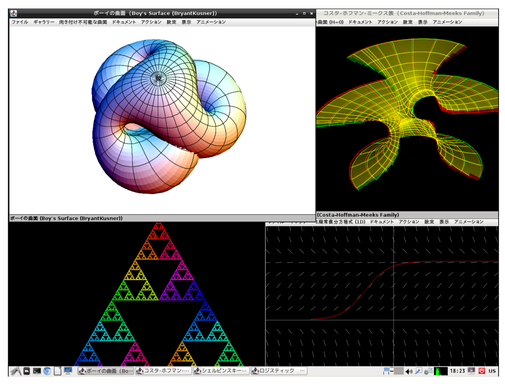

Figure 3: 3D-XplorMath-J

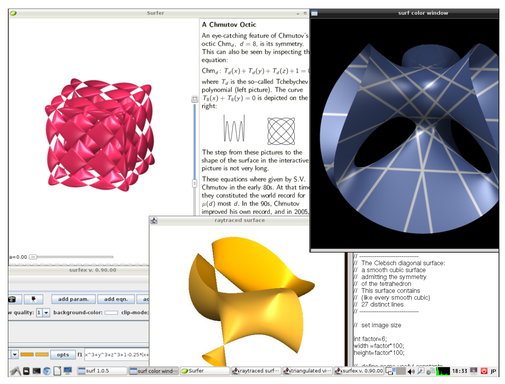

Figure 4: Surf family

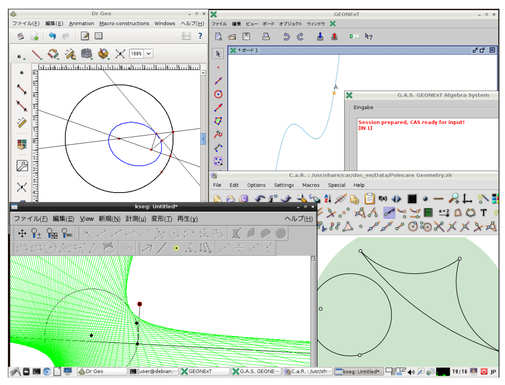

Figure 5: Dynamic Geometry Software

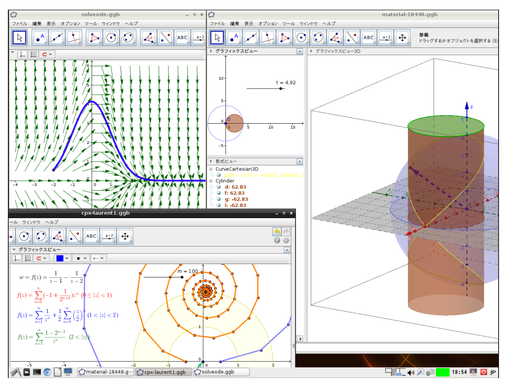

Figure 6: GeoGebra4 and GeoGebra5β

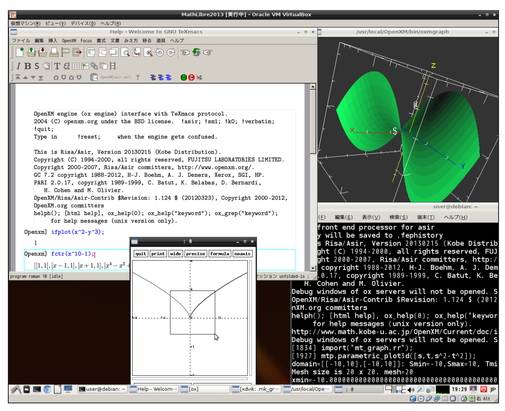

Figure 7: Risa/Asir(OpenXM)

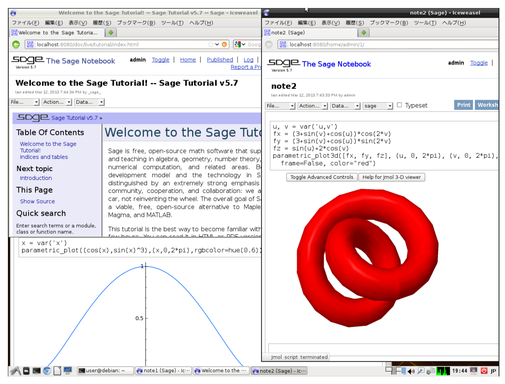

Figure 8: SAGE notebook

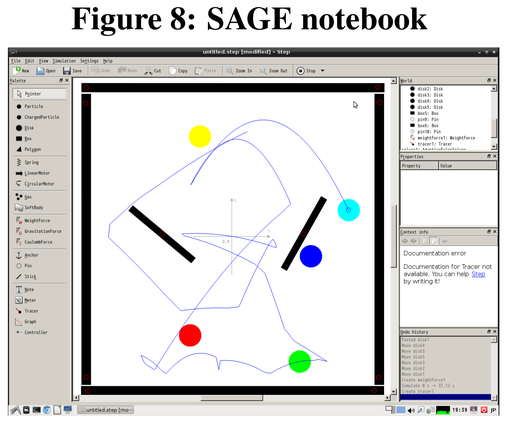

Figure 9: Step: Physics Simulator

How to run the live system (IntelMac)

In order to run the live system on Mac, we recommend to use the PC emulator "VMware Fusion" or "VirtualBox". Note that you need to set the "energy save" to "better performance" in the "system preferences". Otherwise, the parallel virtual machine will not return after being in sleep mode.

FAQ (frequently asked questions)

Q. Where can I get it?

A. We have an exhibition booth "mathsoftware.org" of 3–3 in Hall C1 and distributing free DVDs. If you want to download them, you can find them at `ftp://ftp.mathlibre.org/pub/mathlibre/`

Q. Where can I find documents of mathematical software systems.

A. Click "Math software" on the desktop of the live system. You can find "MathLibre Start" icon, it will show you a list of software systems and documents.

Q. After the power is turned off, I lose all documents which I wrote.

A. If you boot from the DVD, all documents are stored in the RAM. Then, you will lose all your data after the power is turned off. In order to save data permanently, you need to copy them to a USB memory or to the hard disk. Please visit the "Live Systems" site for more details. If you boot with virtualization software and setting the persistent directory in the virtual harddisk, all documents which you wrote will be stored permanently.

Q. How do I copy documents to other machines?

A. There are numerous ways (1) sending documents as an attachment of a web mail (2) using the "scp" command (3) using USB drive, (4) using DropBox, a free network storage service.

Q. How do I install the MathLibre to my hard disk like other linux systems?

A. If you are an expert, please select the boot menu "Install" or "Graphical Install". If you are not expert, we recommend you do not try this and instead use the preinstalled image file for the VirtualBox. It is very easy and comfortable.

Q. The computer starts from the DVD, but the screen becomes black and the system hangs. What should I do?

A. Our system does not use your hard disk unless you mount it. Therefore, you may turn off your power switch and it will cause no damage to your computer.

Q. Can I use other language?

A. You can download other language edition from our ftp sites. If you are familiar with Linux system, you can copy configuration files of MathLibre from GitHub and personalize and build it.

Q. How do you build this system.

A. We are using the Live Systems project, it's an official project of Debian GNU/Linux.

Q. How to start the input method?

A. You will start input method with Shift+Space.

Q. Can I use old i386 computer?

A. Yes, for using i386 version of MathLibre, but it's only a subset now, some applications are not yet installed.

Q. What is the password for "user"?

A. Live Systems is using the password "live" for the account "user".

Q. What is the password for "root"?

A. Please use the command "`sudo`" or "`sudo -s`". There are no password.

References

[1] Tatsuyoshi Hamada et al. Knoppix/math: Portable and distributable collection of mathematical software and free documents. In *Proceedings of ASCM2005*, pages 255–258. Springer, 2005.

[2] Tatsuyoshi Hamada et al. A live system for enjoying mathematics with computer. In Ilias S. Kotsireas and Austin A. Lobo, editors, *ACM Communications in Computer Algebra*, volume 42, pages 175–176. SIGSAM, September 2008.

MathLibre is a live Linux, it's bootable from DVD. But, you may think it's inconvenient for the slow speed of DVD. When you use virtual machine on your host operating system and putting the ISO image file on your hard disk, you can boot MathLibre computer environment with your operating system at the same time. You can use persistent home directory and install your favorite Debian packages with this environment.

We use an open source virtual machine, VirtualBox[1]. VirtualBox is an application on your operating system, you can use your favorite operating systems on it. Now, it's developed by Oracle Corporation. We prepare setting files for making virtual environment in *vbox* folder of MathLibre DVD.

1 Installing VirtualBox

We introduce how to boot MathLibre on Windows. You can make virtualization environment on Mac with the similar way.

1. Please check the file VirtualBox-4.3.*-*-Win.exe in MathLibre DVD, or download the current version of VirtualBox and install with administration mode.

2. Please unzip the file *mathlibre2014en-vm.*zip to your favorite place, for example in your *Documents* folder. We set the name of extracted folder *mathlibre2014en-vm*.

2 Getting the MathLibre ISO image file

You have two choices for getting MathLibre ISO image, "Download" and "Making from DVD".

2.1 Downloading the ISO image file

If you can use the Internet connection, please download the current ISO image from ftp site[2]. It has around 4GB, it takes some minutes or hours. When you finish downloading the ISO file, move it in the folder *mathlibre2014en-vm* and rename this ISO file to *mathlibre2014.iso*.

2.2 Making the ISO image file from DVD

When you have MathLibre DVD, you do not need the Internet connection for getting ISO image. MathLibre DVD is including the Windows application, InfraRecorder[3]. We can make ISO image file with MathLibre DVD.

1. Unzip the file ir053_portable_x64.zip in MathLibre DVD.

2. Execute infrarecorder.exe in the folder ir053_portable_x64.

3. Select Read Disc.

4. You can find DVD drive as "Source:".

5. Select ISO image file *mathlibre2014.iso* in the folder *mathlibre2014en-vm* for Image file:.

6. Clicking OK button, it will start to copy DVD in your hard disk.

7. It takes about 15 minutes for making 4GB ISO image.

3 Booting the virtual machine

When you finish every procedures, execute VirtualBox with double clicking *mathlibre2014en-vm.vbox* in *mathlibre2014en-vm* folder. Click the Start icon and push Enter key, you can enjoy mathematical software.

4 How to make Shared Folders

1. Click the Settings icon of VirtualBox, and select Shared Folders, you can find "+ folder" icon, click this icon and set Folder Path and Folder Name, for example, the folder name is `X`, you should keep in mind, check Auto-mount box and push OK button.

2. In virtual machine, this shared folder is mounted with `/media/sf_X`. We will create a symbolic link to this folder with the name `Y`. It is similar to shortcut in Windows. You can make it with the following command:

```
ln -s /media/sf_X Y
```

3. Logout and login with username:user and password:live. You can access to the shared folder with this command in a terminal.

```
ls Y
```

Of course, you are able to use a file manager PCManFM, so you can share files with this shared folder between host operating system and MathLibre virtual machine.

5 Some tips

If you have some troubles for booting MathLibre with VirtualBox, please check the BIOS menu of "Intel Virtualization Technology" is valid or not.

[1] `http://www.virtualbox.org/`
[2] `ftp://ftp.mathlibre.org/pub/mathlibre/`
[3] `http://infrarecorder.org/`