

[Download 3-1-1](#)
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[Report Bugs](#)
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[Teams](#)
[Join Us](#)

## MAIN

[Home](#)
[News](#)
[Publications](#)
[How to cite](#)
[Singular](#)

## COMMUNITY

[Forum](#)
[Trac](#)
[Events](#)
[Internal](#)

## SYSTEM

[SVN](#)
[Repository](#)
[Third-party  
software](#)

## MISC

[Links](#)
[Contact](#)
[Impressum](#)
[Home](#) ▶ [Download 3-1-1](#)

## INSTALL SINGULAR 3-X-X ON A LINUX/UNIX PLATFORM (GENERIC INSTALLATION)

### Downloading SINGULAR Archives

To install **SINGULAR** on a Unix (including Linux and Mac Os X) platform, you need the following two archives:

1. `Singular-3-x-x-share.tar.gz` (system independent part)
2. `Singular-3-x-x-architecture.tar.gz` (system dependent part)

where you have to replace the following:

"3-x-x" has to be replaced by the version number of the **SINGULAR** system to be installed

"architecture" has to be replaced according to the following table:

Architecture	Description of System
ix86-Linux	32-bit Linux System on Intel Pentium (or compatible)
x86_64-Linux	64-bit Linux System on AMD 64 (or compatible)
SunOS-5	Solaris 8 on 32-bit Sparc
SunOS-5-64	Solaris 8 on 64-bit UltraSparc
ix86-freebsd	32-bit FreeBSD on Intel Pentium (or compatible)
AIX-4	AIX 4
IA64-Linux	64-bit Linux System on Itanium 2
ix86Mac-darwin	Mac Os X 10.5 on Intel

These (and other) archives can be downloaded from <http://www.mathematik.uni-kl.de/ftp/pub/Math/Singular/UNIX>.

For example an installation of **SINGULAR** 3-1-1 on a 32-bit Linux System needs the file named "Singular-3-1-1-ix86-Linux.tar.gz".

Please contact us if you cannot find an archive appropriate for your architecture.

### Installing SINGULAR

Make sure that you have approximately 12MByte of free disk space and follow these steps:

1. Change to the directory where you wish to install Singular, for example:

```
cd /usr/local
(this requires superuser privileges), or
mkdir install; cd install
(requires no superuser privileges).
```

**SINGULAR** specific subdirectories will be created in such a way that multiple versions and multiple architecture dependent files of Singular can peacefully coexist under the same `/usr/local` tree.

## 2. Unpack the archives:

```
gzip -dc path-to-your-download-folder/Singular-3-x-x-
architecture.tar.gz | tar -pxf -
gzip -dc path-to-your-download-folder/Singular-3-x-x-
share.tar.gz | tar -pxf -
```

(Do not forget to replace the string `architecture` as above.)

This creates the directory `Singular/3-x-x` with the following subdirectories

```
(contains Singular and ESingular executables)
LIB (contains SINGULAR libraries - *.lib files)
emacs (files for the SINGULAR Emacs user interface)
info (info files of SINGULAR manual)
html (html files of SINGULAR manual)
doc (miscellaneous documentation files)
examples (SINGULAR examples - *.sing files)
```

For the executable to work, the directory layout must look pretty much like this; the executable looks for "sibling" directories at run-time to figure out where its **SINGULAR** libraries and on-line documentation files are. These constraints on the local directory layout are necessary to avoid having to hard-code pathnames into the executables, or require that environment variables be set before running the executable. In particular, **you must not move or copy the SINGULAR executables to another place, but use soft-links instead.**

The following steps are **optional**:

### **ARRANGE THAT TYPING `singular` AT THE SHELL PROMPT STARTS UP THE INSTALLED SINGULAR EXECUTABLE.**

If you **have superuser privileges**, do:

```
ln -s `pwd`path-to-your-installation-folder/Singular/3-
x-x/architecture/Singular /usr/local/bin/Singular-3-x-x
ln -s `pwd`path-to-your-installation-folder/Singular/3-
x-x/architecture/ESingular /usr/local/bin/ESingular-3-
x-x
ln -s /usr/local/bin/Singular-3-x-x
/usr/local/bin/Singular
ln -s /usr/local/bin/ESingular-3-x-x
/usr/local/bin/ESingular
```

Otherwise, append the directory ``pwd`path-to-your-installation-folder/Singular/3-x-x/architecture/` to your `$PATH` environment variable. For the `csh` (or, `tcsh`) shell do:

```
set path=(`pwd`path-to-your-installation-
folder/Singular/3-x-x/architecture $path)
```

For the `bash` (or, `ksh`) shell do:

```
export PATH=`pwd`path-to-your-installation-
folder/Singular/3-x-x/architecture/:$PATH
```

You might also want to adjust your personal start-up files (`~/.cshrc` for `csh`, `~/.tcshrc` for `tcsh`, or `~/.profile` for `bash`) accordingly, so that the `$PATH` variable is set automatically each time you login.

**IMPORTANT: Do never move or copy the file `Singular/3-x-x/architecture/Singular` to another place, but use soft-links instead.**

**IF YOU WANT TO USE ANY OF FOLLOWING FEATURES OF SINGULAR, MAKE SURE THAT THE RESPECTIVE PROGRAMS ARE INSTALLED ON YOUR SYSTEM:**

Feature	Requires
running ESingular, or Singular within Emacs	<b>Emacs</b> version 20 or higher, or, <b>XEmacs</b> version 20.3 or higher (ESingular is only included in the Linux distribution, on other Unix platforms you can download the <b>Singular emacs lisp files</b> but we give no warranties for specific platforms).
on-line info help	<b>info</b> , or <b>tinfo</b> texinfo browser programs
TAB completion and history mechanism of ASCII-terminal interface	shared <b>readline</b> library, i.e. <code>/usr/lib/libreadline.so</code>
visualization of curves and surfaces	<b>surf</b> version 0.9 or higher (only available for Linux and Solaris).

Most of these programs can be downloaded from <http://www.mathematik.uni-kl.de/ftp/pub/Math/Singular/utills/>.

#### CUSTOMIZE THE ON-LINE HELP SYSTEM:

By default, on-line help is displayed in the first available help browser defined in `Singular/3-x-x/LIB/help.cnf`.

This behavior can be customized in several ways using the Singular commands `system("--browser",)` and `system("--allow-net", 1)` (or, by starting up Singular with the respective command line options).

In particular, creating the file `Singular/3-x-x/LIB/.singularrc` and putting the Singular command `system("--allow-net", 1);` in it, allows the on-line help system to fetch its `html` pages from **SINGULAR's web site** in case its local `html` pages are not found.

We refer to the **online manual** for more details on customizing the on-line help system.

#### ASSURE THAT THE SINGULAR MANUAL CAN BE ACCESSED FROM STAND-ALONE TEXINFO BROWSER PROGRAMS SUCH AS `INFO` OR `EMACS`:

Add the line

```
* Singular:(singular.hlp). A system for polynomial
  computations
```

to your system-wide `dir` file (usually `/usr/info/dir` or `/usr/local/info/dir` and copy or soft-link the file `Singular/3-x-x/info/singular.hlp` to the directory of your `dir` file.

This is **not necessary for the use of the help system from within Singular**.

## Troubleshooting

### GENERAL: SINGULAR CAN NOT FIND ITS LIBRARIES OR ON-LINE HELP

1. Make sure that you have read and/or execute permission the files and directories of the **SINGULAR** distribution. If in doubt, `cd` to the directory where you unpacked Singular, and do (as root, if necessary):
 

```
chmod -R a+rX Singular
```
2. Start up Singular, and issue the command `system("Singular");`. If this does not return the correct and expanded location of the **SINGULAR** executable, then you found a bug in **SINGULAR**, which we ask you to report (see below).
3. Check whether the directories containing the libraries and on-line help files can be found by **SINGULAR**: If `$bindir` denotes the directory where the **SINGULAR** executable resides, then **SINGULAR** looks for library files as follows:
  - (0) the current directory
  - (1) all dirs of the environment variable `SINGULARPATH`
  - (2) `$bindir/LIB`
  - (3) `$bindir/../LIB`
  - (4) `/usr/local/Singular/3-x-x/LIB`
  - (4) `/usr/local/Singular/LIB`
 The on-line `info` files need to be at `$bindir/../info` and the `html` pages at `$bindir/../html`.

You can inspect the found library and `info/html` directories by starting up **SINGULAR** with the `--version` option, or by issuing the **SINGULAR** command `system("--version");` .

### UNDER SUSE-LINUX, ESINGULAR DOES NOT DISPLAY A PROMPT:

This is due to the very restrictive access rights of `/dev/pty*` of the standard **SuSE** distribution (starting from version 6.3 on). As root, do one of the following: Either

```
chmod 666 /dev/pty*
```

or,

```
chmod g+s $(which emacs) chgrp tty $(which emacs) chmod g+s $(which xemacs) chgrp tty $(which xemacs)
```

### FOR HPUX SYSTEMS:

The `/etc/termcap` files which are pre-installed on these systems are broken which leads to messages like

```
Name collision between 9826 9836
```

when **SINGULAR** is started. To fix this, you can get fixed `termcap` files from <ftp://www.mathematik.uni-kl.de/pub/Math/Singular/utills> by downloading the files `termcap-` and either replace your `/etc/termcap` file by the file found there, or view, and redo the respective changes by `diff`'ing the downloaded and the original file.

**FOR iX86-LINUX SYSTEMS:**

Due to some incompatibilities of shared libraries, the start-up of **SINGULAR** might fail with messages like

```
Can not find shared library ...
```

For DEBIAN systems, try to do `ln -s /usr/lib/libncurses.so /usr/lib/libncurses.so.4`.

If this fails (and on other systems) download and install `singular-3-x-x-ix86-Linux-static.tar.gz`.

**FOR AIX SYSTEMS:**

The default `info` program of the system is not GNU's texinfo browser which is used to display the on-line documentation in the `info` format. Therefore, the distribution of the AIX executable already contains the `info` browser program. If you remove this program, make sure that the GNU `info` program is executed if you call '`info`' from your shell.

**FOR ANY OTHER TROUBLES:**

Please send an email to [singular@mathematik.uni-kl.de](mailto:singular@mathematik.uni-kl.de) and include the header which is displayed by starting up **SINGULAR** with the `-v` option, and a description of your machine (issue the command `uname -a` on your shell) in your report.

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