

TOMLAB INSTALLATION GUIDE

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1 Installation Guide Overview

This guide describes the installation of the TOMLAB Optimization Environment on the following operating systems: Windows (XP, XP-64, Vista, 7, 8, 10), Linux (64-bit), Mac OS X (Intel, 64-bit). It is basically the same procedure on all operating systems: Execute the installer, possibly set some environment variables and install the license files.

The first step is to [register as a TOMLAB user](#) and download the appropriate distribution. Execute 'ver' and 'computer' in MATLAB to find out which version you have.

Make sure the system is supported by TOMLAB in Section 2, then go to Section 3 and follow the instruction to obtain a copy of TOMLAB. When the installation file has been downloaded, go to Subsection 4 for the system in question and follow the instructions. To get some modules of TOMLAB to work, e.g: TOMLAB /CPLEX and TOMLAB /KNITRO, some environment variables may need to be set. How to do this is described in Section 5. The last step is to install the license file(s), which is described in Section 6.

2 Supported platforms

TOMLAB supports the following platforms and MATLAB versions:

- Windows 32-bit (MATLAB 7.5 and above)
- Windows 64-bit (MATLAB 7.5 and above)
- Linux x86-64 64-bit (MATLAB 7.5 and above)
- Mac OS X 64-bit Intel (MATLAB 7.9 and above)

3 Downloading TOMLAB

In order to download TOMLAB a myTOMLAB account needs to be created at: <https://tomopt.com>. When a myTOMLAB account exist, login and go to the Download → Products section, from where TOMLAB can be downloaded.

Here is a complete list of the files needed:

- Windows 32-bit,
 - MATLAB ≥ 7.12 + tomlab-win32-R2011a-setup.exe
 - MATLAB 7.5+-7.11 : tomlab-win32-setup.exe
- Windows 64-bit,
 - MATLAB ≥ 7.5 : tomlab-win64-setup.exe
- Linux 64-bit,
 - MATLAB ≥ 7.5 : tomlab-lnx64-setup.bin
- Mac OS X,
 - MATLAB ≥ 7.9 - R2016b: tomlab-osx64-setup.dmg
 - MATLAB $\geq R2017a$: tomlab-osx64-clang-setup.dmg

4 Installing TOMLAB

This section describes how to install the TOMLAB software. Follow the instructions in the section for your operating system.

4.1 Install on Windows

For Windows an installer extracts the TOMLAB files and automatically sets the `PATH` environment variable to point at directories containing dynamic libraries required by some TOMLAB modules. See Section 4.3.1 for more information about the steps.

It is recommended to terminate all instances of MATLAB during the installation to make sure the `PATH` environment variable is properly set in the MATLAB environment when starting to use TOMLAB. Execute `getenv('path')` in MATLAB to confirm the presence of `tomlab/shared`.

As the `PATH` environment variable is set automatically, one can skip Section 5 and go directly to Section 6.

If the installer failed to set the `PATH` environment variable, go to Section 5 and read about how to do it manually. Any Matlab sessions that were running during setup must be restarted for the `PATH` change to be recognized. Alternatively, the entire OS can be restarted.

4.2 Upgrade on Windows

With Add/Remove Programs from the control panel, remove the TOMLAB Optimization Environment. Make sure that (only) `tomlab.lic` remains in the installation folder and install the new version in the same location. As defaults in TOMLAB may change over time a backup copy of the old version is recommended.

4.3 Install on Unix-like systems

The software is installed by a self-extracting executable installer, similar to the one used on Windows systems. The files for each operating system can be found in Section 3.

After downloading the installer for your platform and Matlab version, simply execute the `tomlab-X-setup.bin` file, where X represents your platform and Matlab version. The installer can be run in text mode if no display is available.

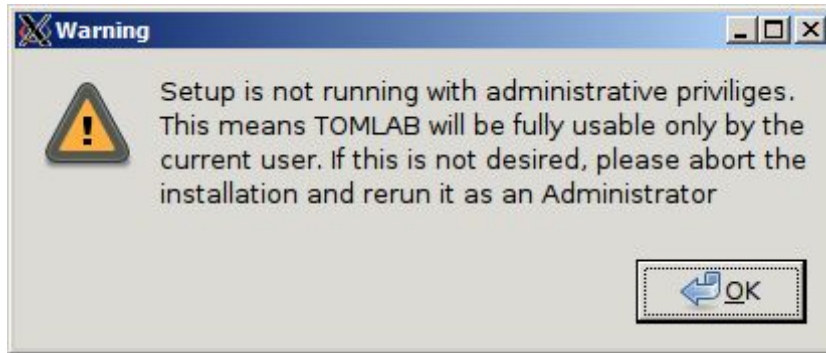
Note: Mac OS X users should always execute `startup.m` when using TOMLAB.

4.3.1 Interactive installation

Execute the installer binary by double clicking its icon, or invoke it from a shell:

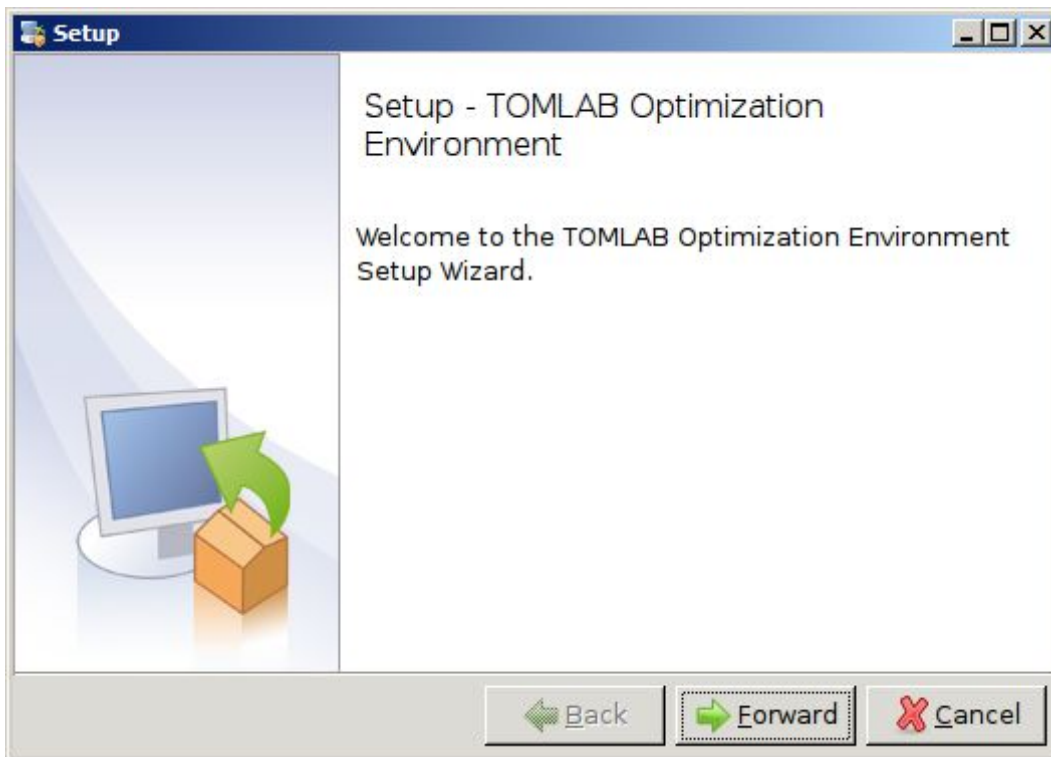
```
[user@host:~] ./tomlab-X-setup.bin
```

If you are running the installer as a regular user, a warning may be displayed.



Currently this warning can be ignored since a manual step (see Setting environment variables 5) is still required to make TOMLAB fully usable.

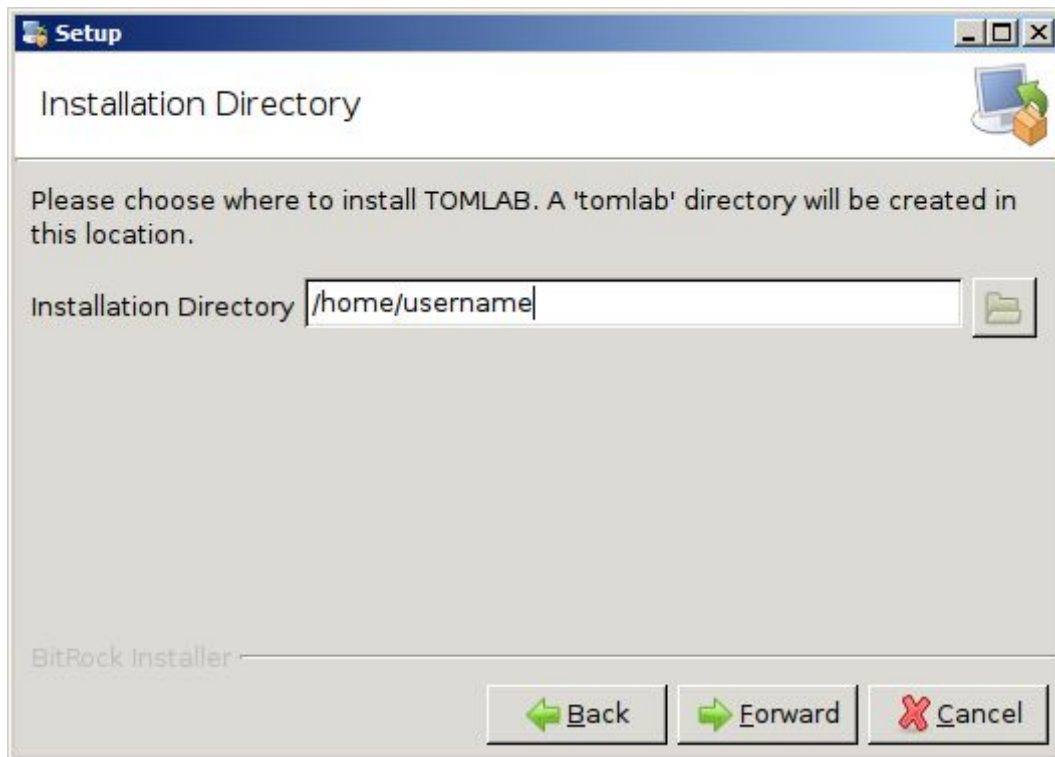
At the welcome screen, simply press Forward.



The TOMLAB license agreement will be displayed. Please read it and mark the "I accept the agreement" if you agree to be bound by it. Press Forward.



Enter the directory in which to install TOMLAB. Please note that a 'tomlab' directory will be added to the path you specify here.



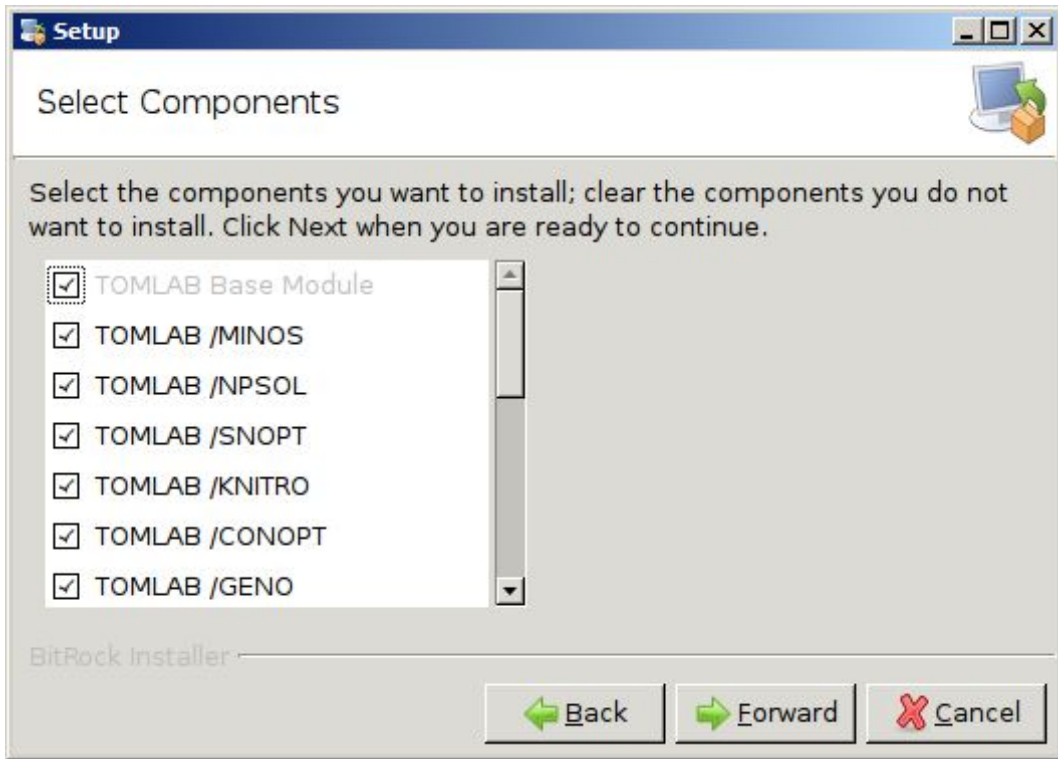
The default location for single user installations is in `$HOME/tomlab`, thus showing as just your home directory.

The default location if installing with super-user privileges is in `/opt/tomlab` (which will thus show as `/opt`) in the dialogue.

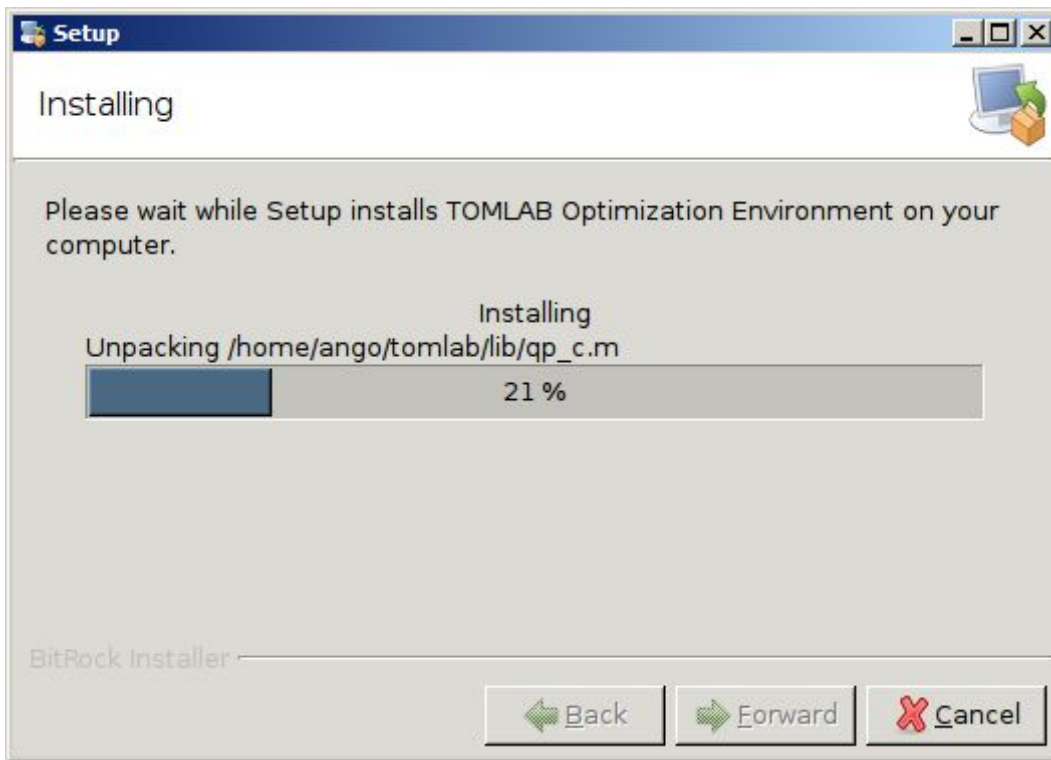
Press Forward after entering the desired path.

At the Component Selection screen, it is usually safe to leave everything selected. Only deselect packages if you know you need to do so.

Press Forward to proceed.



During installation, a progress bar will appear.



At the final page, simply press the Finish button to exit the installer.

4.3.2 Text mode interactive installation

Execute the installer from the shell.

```
[user@host:~]$ ./tomlab-X-setup.bin --mode text
```

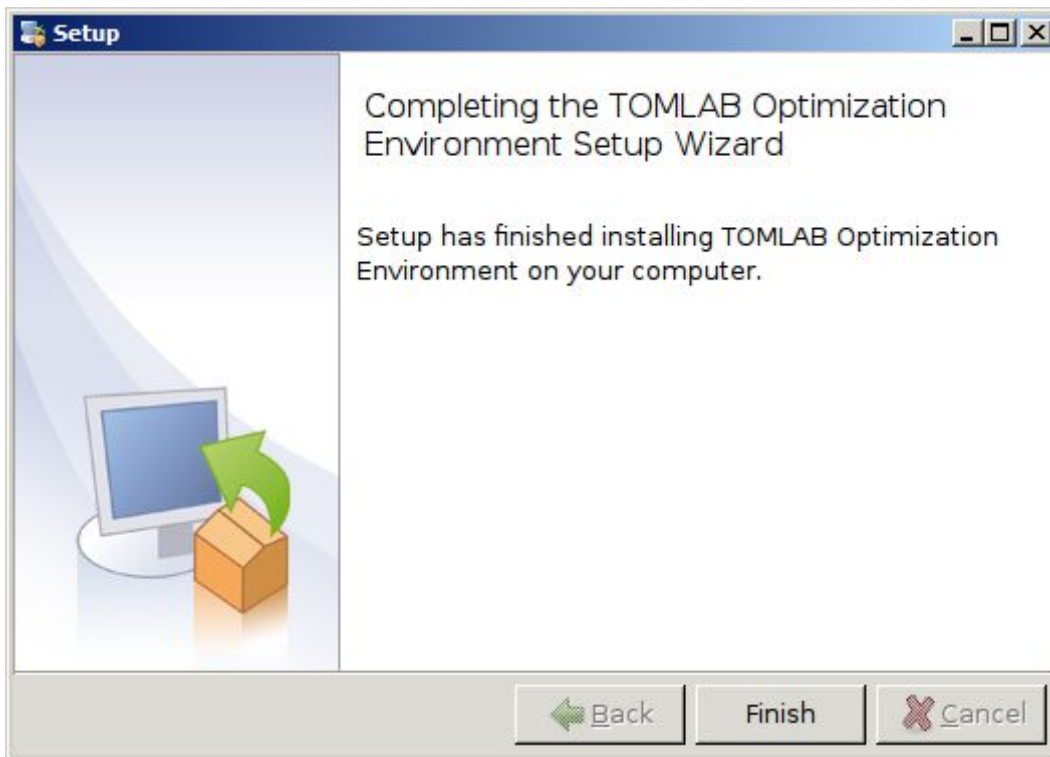
If you are running the installer as a regular user, a warning may be displayed:

```
Warning: Setup is not running with administrative privileges.  
This means TOMLAB will be fully usable only by the current user.  
If this is not desired, please abort the installation and rerun  
it as an Administrator Press [Enter] to continue :
```

Currently this warning can be ignored since a manual step is still required to make TOMLAB fully usable by anyone.

The TOMLAB license agreement will be displayed - press Enter several times to read the agreement and at the question if you accept the license, press "y" if you accept, or "n" otherwise.

```
Do you accept this license? [y/n]:
```



Enter the location where TOMLAB will be installed. **Please note that a directory 'tomlab' will be created in this location, i.e. do not enter a trailing 'tomlab' dir yourself.**

The default location for single user installations is in the \$HOME directory.

The default location if installing with super-user privileges is in /opt/tomlab (will show as /opt) in the dialogue.

Please choose where to install TOMLAB.

A 'tomlab' directory will be created in this location.

Installation Directory [/home/user]:

The next questions concern package selection. You can safely leave all packages selected by simply pressing Enter at each prompt.

At the next question, press Y to install TOMLAB:

Setup is now ready to begin installing TOMLAB Optimization Environment on your computer.

Do you want to continue? [Y/n]: Y

An installation progress bar will be shown during installation. After installation, the installer program will exit.

```

-----
Please wait while Setup installs TOMLAB Optimization Environment
on your computer. Installing
0% ----- 50% ----- 100%

```

```
#####
```

```
-----  
Setup has finished installing TOMLAB Optimization Environment on  
your computer.
```

4.3.3 Unattended installation

TOMLAB can be installed without any user interaction at all. To perform an unattended installation, execute the installer binary with the following options:

```
[user@host:~]$ [sudo] ./tomlab-X-setup.bin --mode unattended  
--prefix /path/to/installation_dir
```

The argument to the `--prefix` option should not include a trailing `/tomlab` directory - one will be added automatically.

4.4 Upgrade on Unix-like systems

The first step is to save a copy of the license file (and make a backup copy of the old version if needed). Assuming that TOMLAB is installed in `/usr/local/matlab7/tomlab` execute the follow commands:

```
$ cd /usr/local/matlab7/tomlab  
$ mv tomlab.lic ../
```

Then remove the old version:

```
$ cd ..  
$ rm -f -r tomlab
```

Install the new version as described in section 4.3 and move back the license:

```
$ mv tomlab.lic ./tomlab
```

5 Setting environment variables

On Windows, TOMLAB requires the directory `tomlab/shared` to be included in the environment variable `PATH`.

On Linux, TOMLAB requires the `tomlab/shared` folder to be present in the `LD_LIBRARY_PATH` environment variable. If TOMLAB is installed with super-user privileges on Linux, the installer will add a `ldconfig` entry to `/etc/ld.so.conf.d/tomlab.conf`, eliminating the need for manual manipulation of `LD_LIBRARY_PATH`.

It is possible to set this in several ways.

5.1 Shared libraries path

The library search path environment variable name differs between different systems:

- Linux: LD_LIBRARY_PATH
- Windows: PATH

TOMLAB for Mac OS X does not currently require the corresponding variable to be set, due to all binaries having hard-coded paths to their respective dependencies. This, on the other hand, demands that binary files in the TOMLAB directory are not moved from their locations.

The way environment variables are set varies depending on operating systems and shells.

5.1.1 Windows

To set the PATH environment variable permanently on Windows, do: Control Panel → System → Advanced → Environment Variables. Assuming TOMLAB was installed in C:\tomlab, append (or prepend) C:\tomlab\shared separated to the other entries with a semi-colon (;) to the PATH environment variable.

The PATH environment variable can also be set temporarily in a running command shell. This is done by doing

```
C:\> set PATH=%PATH%;C:\tomlab\shared
```

This change will only be applied in that command shell, and will therefore be discarded when the command shell is terminated.

5.1.2 Linux systems

Set on command line when invoking MATLAB:

```
[user@host:~]$ LD_LIBRARY_PATH=[$LD_LIBRARY_PATH:]/tpath/shared <ml> &
```

where <ml> is the name of your MATLAB executable and *tpath* is the TOMLAB installation path. If LD_LIBRARY_PATH is already set to something and you wish to preserve this, include the part in [] - but not the actual brackets themselves.

Set in \$HOME/.bashrc, \$HOME/.profile, \$HOME/.cshrc (or \$HOME/.matlab7rc.sh if it exists):

```
export LD_LIBRARY_PATH=/tpath/shared # bash
setenv LD_LIBRARY_PATH /tpath/shared # csh and similar
```

If you have an existing value in LD_LIBRARY_PATH, use a colon : to separate directories when adding the TOMLAB directory:

```
export LD_LIBRARY_PATH=/tpath/shared:$LD_LIBRARY_PATH # bash
setenv LD_LIBRARY_PATH /tpath/shared:$LD_LIBRARY_PATH # csh and similar
```

If installing for multiple users as super-user, /etc/ld.so.conf.d/tomlab.conf is automatically created, eliminating the need for path manipulation.

Mac OS X installations do not require the corresponding variable DYLD_LIBRARY_PATH to be set, but proper function depends on the location of the tomlab/shared folder and its contents.

5.1.3 MATLAB 7.8+ on 64-bit Linux

A potential problem concerning shared library versions may lead to crashes when running certain TOMLAB MEX files. This is related to MATLAB and/or the runtime linker loading the wrong version of a support library.

The following workaround is suggested:

Start Matlab 7.8+ from a shell prompt with the following option:

```
[user@host:~] LD_PRELOAD=$TOMLAB/shared/libgfortran.so.1.0.0 \  
LD_LIBRARY_PATH=$TOMLAB/shared \  
$MATLAB78 &
```

In the above command, replace \$TOMLAB with the path to your TOMLAB installation, and \$MATLAB78 with the name of your MATLAB 7.8 binary. This may vary depending on your particular setup, e.g. if having a symbolic link to the MATLAB binary or not. You may need to specify the full path to the MATLAB installation. For example:

```
[user@host:~]$ LD_PRELOAD=/home/user/tomlab/shared/libgfortran.so.1.0.0 \  
LD_LIBRARY_PATH=/home/user/tomlab/shared \  
/usr/local/matlab78/bin/matlab &
```

Additionally, if using the KNITRO solver and you experience errors about `libgomp.so` not being found, add an `LD_PRELOAD` statement for this library too. Use `locate` or `find` to find its full path. It is not supplied with TOMLAB.

6 Installing TOMLAB license files

In order to run the TOMLAB solvers a valid license file is required (a plain text file called `tomlab.lic`). This file should normally be placed in the TOMLAB root directory `tomlab`. Demo licenses include an additional file `tomlicd.dat` which also should be put in the TOMLAB root directory.

It is **important** that `tomlicd.dat`, if present, is writable for the user running TOMLAB.

If the license file is placed in a non-standard location, an environment variable (`TOMLAB_LICENSE_FILE`) need to point to the location (full path) of this file.

For Windows XP/Vista/7/10, open the Control Panel, click on System, select the Advanced Tab, and click on Environment variables. Click on New under user variables. Variable name should be set to `TOMLAB_LICENSE_FILE` and variable value to the location of the file (including file name), for example: `C:\tomlab\tomlab.lic`.

If using a UNIX-like system the following command (depending on Shell) archives the same result:

For CSH-like shells:

```
$ setenv TOMLAB_LICENSE_FILE /usr/local/tomlab/tomlab.lic
```

For Bourne-like shells:

```
$ export TOMLAB_LICENSE_FILE=/usr/local/tomlab/tomlab.lic
```

7 Setting up CPLEX

For information on non-standard CPLEX license please contact the TOMLAB support team.

8 Starting TOMLAB

When the files are installed and the license is setup correctly, MATLAB can be started. Change directory to the root directory of TOMLAB (where TOMLAB was installed, that is) and run

```
>> cd c:\tomlab
>> startup
```

or, for a default Linux installation done by super-user:

```
>> cd /opt/tomlab
>> startup
```

This command checks the installation and makes sure the license is properly installed. If everything is ok you may start using TOMLAB. If something is wrong, go back and check every step covered in this guide. If that cannot solve your problem, contact support at support@tomopt.com.

The QUICKSTART GUIDE (available at <https://tomopt.com>) is good for getting started with TOMLAB.