

Setting up our Matlab optimization environment

September 4, 2017

1. Install Matlab (version 7 (R2014) or later is necessary)
2. Install Matpower Version 6.0
3. Install YALMIP
4. Install MOSEK version 8.0

1 Installing Matlab (v7 or later)

You should make sure you have Matlab version 7 (R2014) or later. You can download Matlab from downloads.cc.dtu.dk, following the instructions outlined there.

Please also make sure you have installed the Matlab Optimization Toolbox. A way to check this is from the command prompt:

```
v=ver
any(strcmp('Optimization Toolbox', {v.Name}))
```

If `ans = 1`, then it is already installed. If not, then you have to install it from the tab 'APPS'→'Get More Apps'.

2 Installing Matpower v6.0

Download Matpower from <http://www.pserc.cornell.edu/matpower/>

See the last two pages of this document, extracted from R. D. Zimmerman, C. E. Murillo-Sanchez, *Matpower 6.0 User's Manual*, PSERC, 2016, for instructions on how to install Matpower.

3 Installing YALMIP

Download YALMIP from <https://yalmip.github.io/download/>

See instructions here: <https://yalmip.github.io/tutorial/installation/> about how to install YALMIP, or see below (taken from the readme.txt file inside the installation):

```
*****  
6 steps towards a successful installation  
*****
```

1) Remove any old version of YALMIP

2) unzip yalmip.zip. This should create the structure

```
/yalmip  
/yalmip/@sdpvar  
/yalmip/extras  
/yalmip/demos  
/yalmip/solvers  
/yalmip/modules  
/yalmip/operators
```

3) Put the following paths in your MATLAB path

```
/yalmip  
/yalmip/extras  
/yalmip/demos  
/yalmip/solvers  
/yalmip/modules  
/yalmip/modules/parametric  
/yalmip/modules/moment
```

```
/yalmip/modules/global  
/yalmip/modules/robust  
/yalmip/modules/sos  
/yalmip/operators
```

Most easily done either via the gui or `addpath(genpath('yourlocation/yalmip'))`

- 4) Make sure to have the desired solvers in your path.
- 5) Restart Matlab, or at least type "clear classes".
- 6) Run `yalmiptest.m` and everything should work (as long as you have the necessary solvers).

Learn more at
<http://users.isy.liu.se/johanl/yalmip>

Forum
<https://groups.google.com/forum/?fromgroups#!forum/yalmip>

Comments and bug-reports are highly appreciated.
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4 Installing MOSEK

Download MOSEK from <https://www.mosek.com/downloads/> and install it.

Order a personal academic license from <https://license.mosek.com/academic/>.
Make sure you use your DTU email.

Place the license file in a mosek folder, following the instructions in the email. Please note that you have to create a new mosek folder to which you

will copy the license file. This folder must be in your user home directory.

Run `mosekdiag` in the Matlab command prompt, to make sure Mosek has been installed correctly.

Run `yalmiptest` in the Matlab command prompt. Now yalmip must be using the mosek solvers for LP, QP, SOCP, and SDP problems.

5 Instructions on installing Matpower

See the following two pages, extracted from R. D. Zimmermann, C. E. Murillo-Sanchez, *Matpower 6.0 User's Manual*, PSERC, 2016, for instructions on how to install Matpower.

2.2 Installation

Installation and use of MATPOWER requires familiarity with the basic operation of MATLAB, including setting up your MATLAB path.

Step 1: Follow the download instructions on the MATPOWER home page⁷. You should end up with a file named `matpowerXXX.zip`, where `XXX` depends on the version of MATPOWER.

Step 2: Unzip the downloaded file. Move the resulting `matpowerXXX` directory to the location of your choice.⁸ These files should not need to be modified, so it is recommended that they be kept separate from your own code. We will use `<MATPOWER>` to denote the path to this directory.

Step 3: Add the following directories to your MATLAB path:

- `<MATPOWER>` – core MATPOWER functions
- `<MATPOWER>/t` – test scripts for MATPOWER
- `<MATPOWER>/most` – core MOST functions
- `<MATPOWER>/most/t` – test scripts for MOST
- (optional) sub-directories of `<MATPOWER>/extras` – additional functionality and contributed code (see Appendix E for details).

Step 4: At the MATLAB prompt, type `test_matpower` to run the test suite and verify that MATPOWER is properly installed and functioning.⁹ The result should resemble the following, possibly including extra tests, depending on the availability of optional packages, solvers and extras.

⁷<http://www.pserc.cornell.edu/matpower/>

⁸Do *not* place MATPOWER's files in a directory named `'matlab'` or `'optim'` (both case-insensitive), as these can cause MATLAB's built-in `ver` command to behave strangely in ways that affect MATPOWER.

⁹The MOST test suite is run separately by typing `test_most`. See the [MOST User's Manual](#) for details.

```

>> test_matpower
t_test_fcns.....ok
t_nested_struct_copy...ok
t_feval_w_path.....ok
t_mpooption.....ok
t_loadcase.....ok
t_ext2int2ext.....ok
t_jacobian.....ok
t_hessian.....ok
t_margcost.....ok
t_totcost.....ok
t_modcost.....ok
t_hasPQcap.....ok
t_mplinsolve.....ok (2 of 4 skipped)
t_mips.....ok
t_qps_matpower.....ok (288 of 360 skipped)
t_miqls_matpower.....ok (240 of 240 skipped)
t_pf.....ok
t_cpf.....ok
t_islands.....ok
t_opf_model.....ok
t_opf_mips.....ok (125 of 250 skipped)
t_opf_mips_sc.....ok (125 of 250 skipped)
t_opf_dc_mips.....ok
t_opf_dc_mips_sc.....ok
t_opf_userfcns.....ok
t_opf_softlims.....ok
t_runopf_w_res.....ok
t_dcline.....ok
t_get_losses.....ok
t_makePTDF.....ok
t_makeLODF.....ok
t_printpf.....ok
t_vdep_load.....ok
t_total_load.....ok
t_scale_load.....ok
t_apply_changes.....ok
t_psse.....ok
t_off2case.....ok
t_auction_mips.....ok
t_runmarket.....ok
All tests successful (4830 passed, 780 skipped of 5610)
Elapsed time 17.56 seconds.

```