Tutorial of Matlab Engine installation

Melissa Lopez Portilla

April 2021

In this short tutorial we will explain how to install Matlab's python wrapper, named matlab.engine, in CIT. The pre-requirements are an environment with *Python 3.8.* and Matlab2021, which is already pre-installed in the cluster.
We will install matlab.egine in *ldas-grid.ligo.caltech.edu* , but it also works for other sites.

```
[melissa.lopez@ldas—grid]~% hostname —f
ldas—grid.ligo.caltech.edu
```

To call our conda environment with Python 3, named *igwn-py38* we run the following command.

```
[melissa.lopez@ldas—grid]~% source /home/melissa.lopez/anaconda3/etc/profile.d/conda.sh
[melissa.lopez@ldas—grid]~% conda activate igwn—py38
```

Now, we go to the location of the python wrapper in the cluster and install it.

```
(igwn—py38) [melissa.lopez@x86_64—conda—linux—gnu]~% cd /ldcg/matlab_r2021a/extern/engines/python/
(igwn—py38) [melissa.lopez@x86_64—conda—linux—gnu]/ldcg/matlab_r2021a/extern/engines/python% python
 setup.py build ——build—base=/tmp/r2021a.build install ——prefix=/home/melissa.lopez/matlab2021aPy38
```

Since we do not have root permission, we need to use the non-default folder *"/tmp/r2021a.build"* to build the wrapper with the *build-base* command . We can choose the installation directory with the *prefix* command. With this process the installation is complete, so we can call Python as follows:

```
(igwn—py38) [melissa.lopez@x86_64—conda—linux—gnu]~% env LD_PRELOAD=/ldcg/matlab_r2021a/bin/
 glnxa64/glibc—2.17_shim.so PYTHONPATH=/home/melissa.lopez/matlab2021aPy38/lib/python3.8/site—
 packages python
```

Where LD-PRELOAD calls Matlab and PYTHONPATH connects it with the desired python version from the installation directory. Now, we call matlab.engine and give a small example.

```
Python 3.8.6 | packaged by conda-forge | (default, Jan 25 2021, 23:21:18)
CC 9.3.0] on linux
pe "help", "copyright", "credits" or "license" for more information.
> import matlab.engine
> eng = matlab.engine.start_matlab() #to call engine
> eng.cd('/home/melissa.lopez/Matlab_functions') #path to Matlab functions.
>
> import numpy as np
> x = np.random.rand(1000)
> x_mat = matlab.single(x.tolist()) #to transform into Matlab array.
> #the sampling frequency (srate) and the threshold (thr) also need to be single class.
> srate = eng.single(1000); thr = eng.single(0.005)
>
> result= eng.SSD(x_mat,srate,thr) #to compute the function
> result=np.array(result) #and transform the result to Numpy.
```