Quick examples of generating 1D Greens function by using FK

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Install and use the MTUQ docker image

- Download the MTUQ image

docker pull ghcr.io/seisscoped/mtuq:main

```
dingl@olivine:~$ docker pull ghcr.io/seisscoped/mtuq:main
main: Pulling from seisscoped/mtuq
e0b25ef51634: Already exists
fd0442249241: Pull complete
69d2d869ecd7: Pull complete
4f4fb700ef54: Pull complete
df63c0d8e7d8: Pull complete
36ed403724f5: Pull complete
e98483073e02: Pull complete
f09cd92522a8: Pull complete
6b80f2796c4b: Pull complete
52d565985003: Pull complete
adef19292676: Pull complete
af2df34c81cc: Pull complete
239187b792fb: Pull complete
769884be511d: Pull complete
93ea4ccf9e96: Pull complete
1ebcbd376123: Pull complete
6bf006f9bb5e: Pull complete
efd2eda9455e: Pull complete
4b1dbdee6a77: Pull complete
85862795f89b: Pull complete
287d98057869: Pull complete
Digest: sha256:316474d035494918713330cc74c80913a20df73b53826748824cb2b3db8248f6
Status: Downloaded newer image for ghcr.io/seisscoped/mtuq:main
ghcr.io/seisscoped/mtuq:main
dingl@olivine:~$
```

- Tip: Check docker images

docker images

```
dingl@olivine:~$ docker images
REPOSITORY                TAG       IMAGE ID       CREATED         SIZE
ghcr.io/seisscoped/mtuq   main      8b9b5faa426d   12 hours ago    3.56GB
```

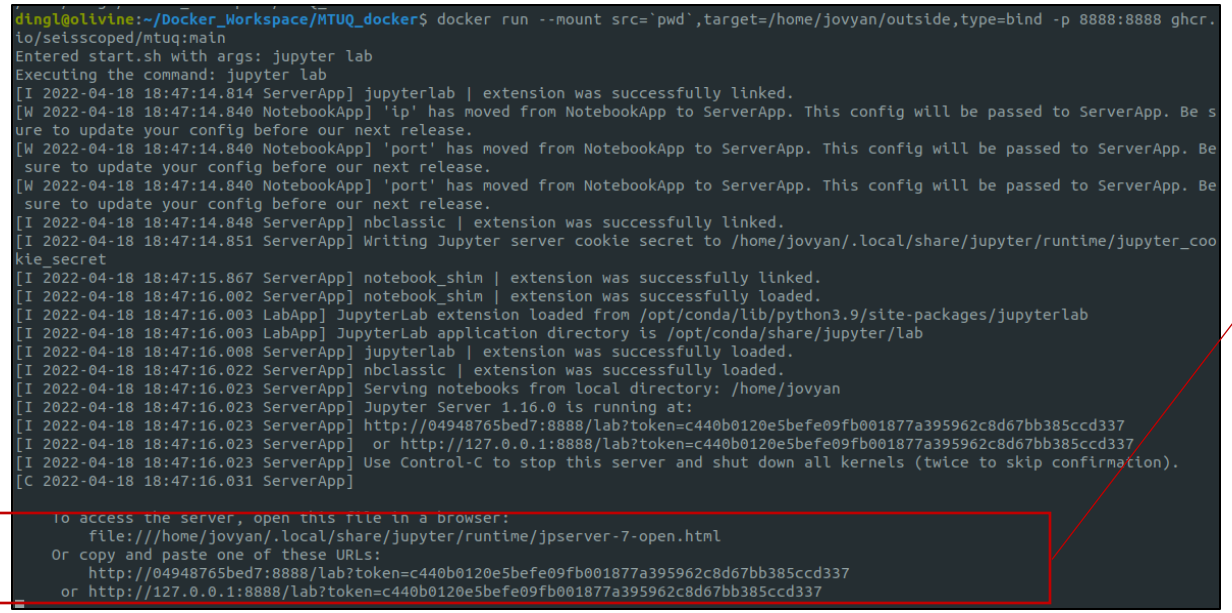
Install and use the MTUQ docker image

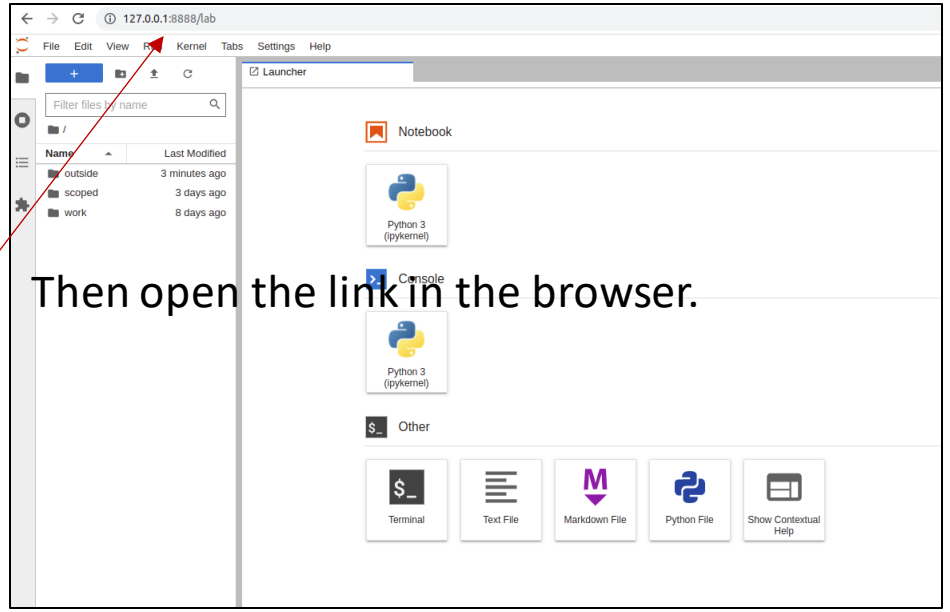
- Run the MTUQ image

docker run -p 8888:8888 ghcr.io/seisscoped/mtuq:main

Or binding with a local folder (eg. current directory)

docker run **--mount src=`pwd`,target=/home/jovyan/outside,type=bind** -p 8888:8888 ghcr.io/seisscoped/mtuq:main





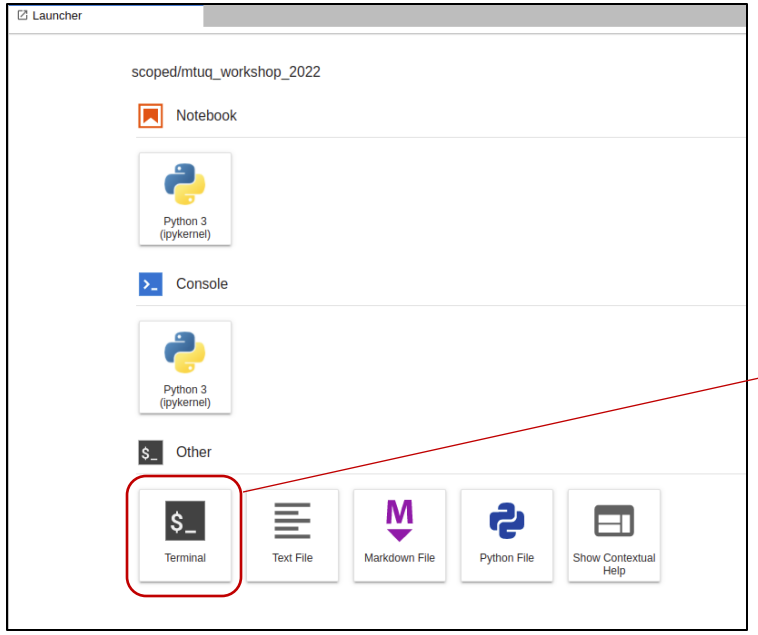
Then open the link in the browser.

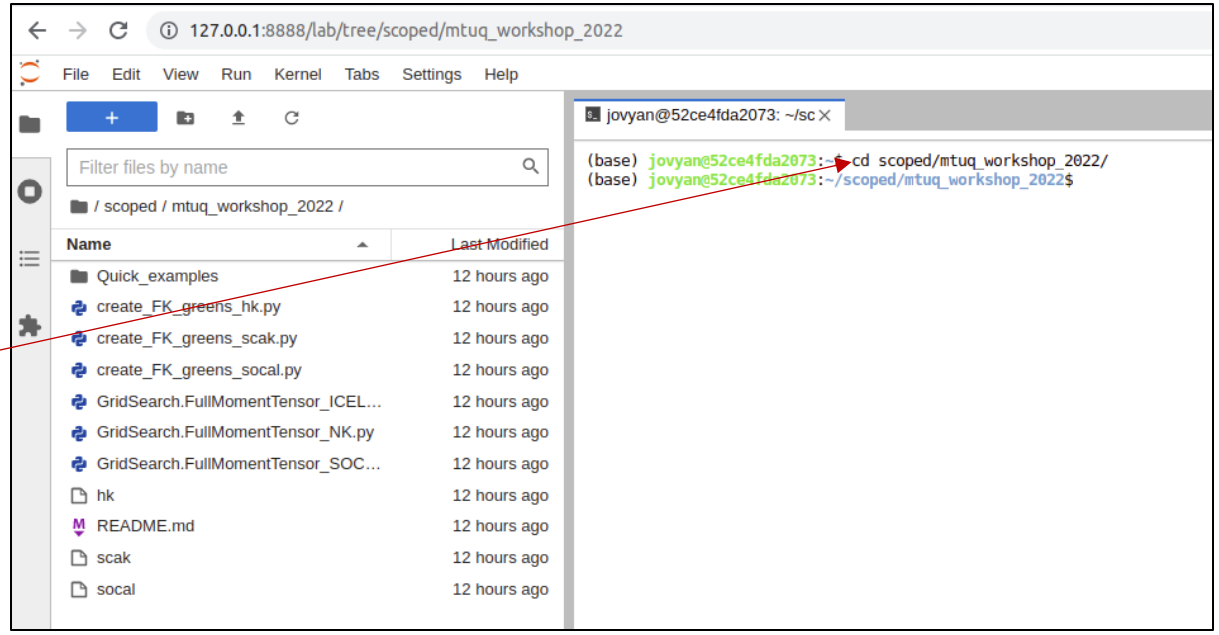
Running FK examples

Attention: Examples should be run in the MTUQ docker image

- Prepare the working space and python scripts

  open a terminal and go to the folder scoped/mtuq_workshop_2022/ by:
  cd scoped/mtuq_workshop_2022/





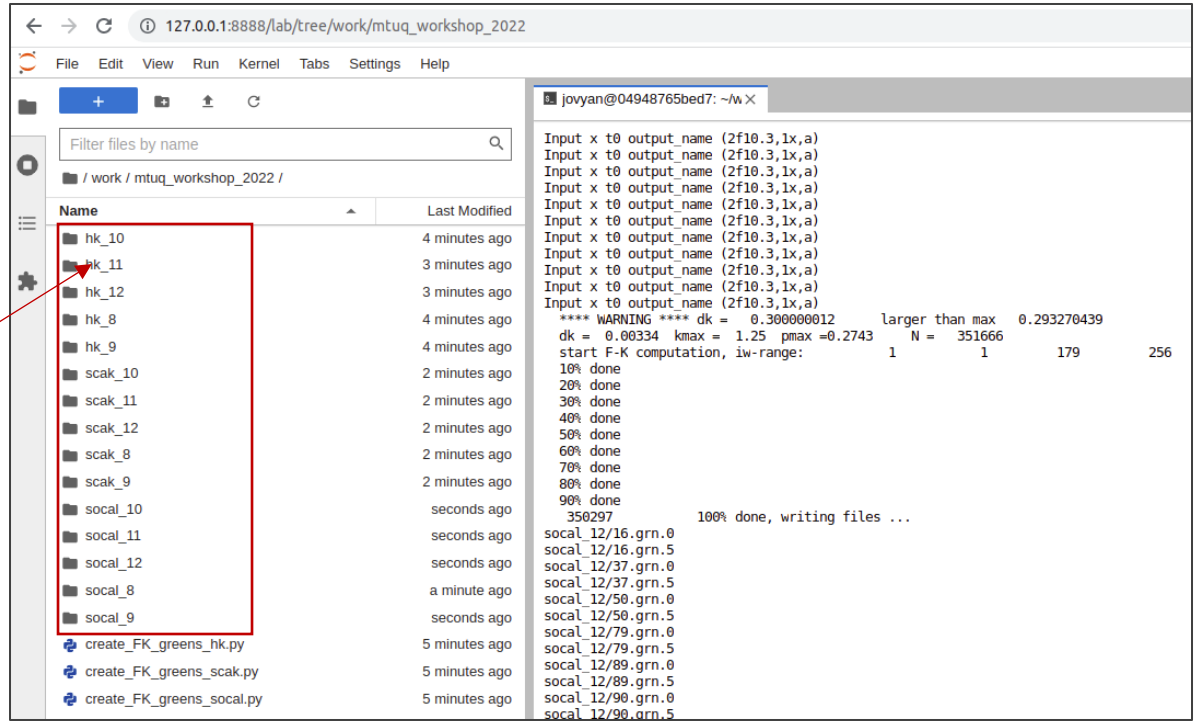
Running FK examples

Attention: Examples should be run in the MTUQ docker image

- Create Greens function

  python create_FK_greens_hk.py
  python create_FK_greens_scak.py
  python create_FK_greens_socal.py

Then, you will see the newly created folders storing the GF.
Folder name: modelName_depth(km)



Use your own velocity model and data

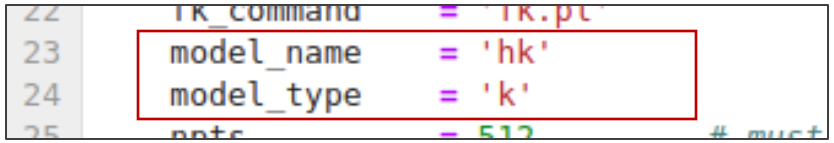
- Velocity model (in units of km, km/s, g/cm3)

Model type	model_type = 'f'					
Format	thickness	vs	vp	rho (default: 0.77 + 0.32*vp)	Qs (default: 500)	Qp (default: 2*Qs)

Model type	model_type = 'k'					
Format	thickness	vs	vp/vs	rho (default: 0.77 + 0.32*vp)	Qs (default: 500)	Qp (default: 2*Qs)

- In python script (lines 23-24):

model_name = 'filename_of_your_model'
model_type = 'your_model_type'



Use your own velocity model and data

- Use your data

Update the following parameters:

path_data = "path to your data"

path_weights = "path to the weight file"

event_id = "your event id"

Searching_depths = "the depth of source generating GF"

```python
#!/usr/bin/env python

import os
import numpy as np
from mtuq import read
from mtuq.util import fullpath
from mtuq.util.cap import parse_station_codes


def create_FK_greens():
    '''Create Greens' function associated with data by using FK. '''

    path_data = fullpath('data/examples/20090407201255351/*.[zrt]')
    path_weights = fullpath('data/examples/20090407201255351/weights.dat')
    event_id = '20090407201255351'

    # user specified searching depth in km
    # searching_depths = np.array([5, 11, 18])       # eg: at 5, 11, 18 km.
    searching_depths = np.arange(8, 13, 1)       # eg: from 8 to 13 km with interval of 1 km.
```

- Other paras:

You may change the following parameters:

npts = "number of points of the GF" (**must be 2^n**)

dt = "time interval of the GF"

```
    npts            = 512          # must be 2^n
    dt              = 0.1
```