

Demonstration of front tracking program+how to modify existing examples (i.e. ued.cgun etc...) to track formation of pareto front.

how_to_run.txt is modified as:

```
#killall spea2
rm -rf tmp/*
rm nohup.out
nohup python FrontTrack.py &
nohup ./var optconf/var_param optexch/RUN01_1 &
nohup ./spea2 optconf/spea2_param optexch/RUN01_1 &
```

Add one line to include the python script FrontTrack.py

```
[mba83@lnx201 test.monitor]$ lsof +D .
```

To confirm it is working type this command. You should see a job for python, var and spea2.

If python job disappears something went wrong....

```
Output information may be incomplete.
COMMAND  PID  USER  FD  TYPE  DEVICE  SIZE/OFF      NODE NAME
bash    13049 mba83  cwd  DIR   0,64    4096 188129392 .
bash    28014 mba83  cwd  DIR   0,64    4096 188129392 .
python   30062 mba83  cwd  DIR   0,64    4096 188129392 .
python   30062 mba83   1w  REG   0,64         0 188117786 ./nohup.out
python   30062 mba83   2w  REG   0,64         0 188117786 ./nohup.out
var      30063 mba83  cwd  DIR   0,64    4096 188129392 .
var      30063 mba83   1w  REG   0,64         0 188117786 ./nohup.out
var      30063 mba83   2w  REG   0,64         0 188117786 ./nohup.out
spea2    30064 mba83  cwd  DIR   0,64    4096 188129392 .
spea2    30064 mba83   1w  REG   0,64         0 188117786 ./nohup.out
spea2    30064 mba83   2w  REG   0,64         0 188117786 ./nohup.out
lsof    32732 mba83  cwd  DIR   0,64    4096 188129392 .
lsof    32733 mba83  cwd  DIR   0,64    4096 188129392 .
[mba83@lnx201 test.monitor]$
```

Quick look at FrontTrack.py

```
from pisapy import ParetoUtil as PU
from pisapy import Monitor as M0
from pisapy import CheckOnRun as CR
import os
import numpy as np
import time
FileDic=PU.MakeFileDic('optconf/var_param',AddPath='')
OutFile=FileDic['outputfile']
OutFileChanged=False
OutFileLine1,OutFileExist=M0.Look4Exist(OutFile)
```

← These 3 scrips need to be added to your pisapy folder.

```
try:os.mkdir('analysis')
except: pass
FrontFile='analysis/CurrentFronts.txt'
os.system('rm '+ FrontFile)
```

← Fronts will be saved in analysis/CurrentFronts.txt. Note that if optimization is rerun CurrentFronts.txt will be deleted.

```
##run file stuff
RunFile='optexch/RUN01_his'
RunFileLine1,RunFileExist=M0.Look4Exist(RunFile)
```

← The optimizer puts the current front in RUN01_his. My program looks for changes to this file.

```
while OutFileChanged==False:
    OutFileLine1,OutFileChanged=M0.Check4Change(OutFile,OutFileLine1)
    RunFileLine1=CR.CheckOnRun(RunFile,RunFileLine1,FrontFile)
    time.sleep(2)
```

This loop checks if the output file has changed. If it has the program terminates because the optimizer finished. If it hasn't it checks if RUN01_his changed and updates CurrentFronts.txt as necessary.

After a few generations run this command from the directory the optimizer is running in:

```
[mba83@lnx201 test.monitor]$ python CreateFrontGif.py
```

And a .gif, along with individual plots of each generation is created in analysis/FrontPlots

A copy of CreateFrontGif.py must be in the directory the optimizer is running in.

Also to make the .gif I assume imagemagick is installed.

Summary of steps needed to track the formation of the pareto front.

1) Modify `.how_to_run.txt` as described.

2) copy `ParetoUtil.py` `CheckOnRun.py` and `Monitor.py` into the `pisapy` folder

3) copy `FrontTrack.py` and `CreateFrontGif.py` into the directory you are running the optimization in.