

# Introduction

In this notebook I examined the behavior of some specific problems that I encountered issue with / think is invalid during data set construction.

```
In [1]: ## Set up

## Library import

# benchmark functions
import pycutest as pct
import numpy as np
```

## Problem with function import issue

```
In [2]: pct.import_problem('WAYSEA1NE')
```

```
-----
-----
AttributeError                                Traceback (most recent c
all last)
/var/folders/1_/b9fd5c090772z4_fy4g88t6w0000gn/T/ipykernel_6642/20
55821240.py in <module>
----> 1 pct.import_problem('WAYSEA1NE')

/usr/local/lib/python3.9/site-packages/pycutest/build_interface.py
in import_problem(problemName, destination, sifParams, sifOptions,
efirst, lfirst, nvfirst, quiet, drop_fixed_variables)
    347     # Import the module CACHE_SUBFOLDER.problemDir, and re
turn a wrapper
    348     try:
--> 349         return CUTEstProblem(__import__('%s.%s' % (CACHE_S
UBFOLDER, problemDir), globals(), locals(), [str(problemDir)]),
    350
drop_fixed_variables=drop_fixed_variables)
    351     except ImportError as error:

/usr/local/lib/python3.9/site-packages/pycutest/problem_class.py
in __init__(self, module, drop_fixed_variables)
    80         # Extract useful problem info
    81
--> 82         self.name = self._module.info['name']
    83         """ CUTEst problem name (string) """
    84

AttributeError: module 'pycutest_cache_holder.WAYSEA1NE' has no at
tribute 'info'
```

```
In [3]: pct.import_problem('HIMMELBA')
```

```
-----  
-----  
AttributeError                                Traceback (most recent c  
all last)  
/var/folders/1_/b9fd5c090772z4_fy4g88t6w0000gn/T/ipykernel_6642/19  
99616473.py in <module>  
----> 1 pct.import_problem('HIMMELBA')  
  
/usr/local/lib/python3.9/site-packages/pycutest/build_interface.py  
in import_problem(problemName, destination, sifParams, sifOptions,  
efirst, lfirst, nvfirst, quiet, drop_fixed_variables)  
    347     # Import the module CACHE_SUBFOLDER.problemDir, and re  
turn a wrapper  
    348     try:  
--> 349         return CUTEstProblem(__import__('%s.%s' % (CACHE_S  
UBFOLDER, problemDir), globals(), locals(), [str(problemDir)]),  
    350 drop_fixed_variables=drop_fixed_variables)  
    351     except ImportError as error:  
  
/usr/local/lib/python3.9/site-packages/pycutest/problem_class.py  
in __init__(self, module, drop_fixed_variables)  
    80     # Extract useful problem info  
    81  
--> 82     self.name = self._module.info['name']  
    83     """ CUTEst problem name (string) """  
    84  
  
AttributeError: module 'pycutest_cache_holder.HIMMELBA' has no att  
ribute 'info'
```

```
In [4]: all_probs = pct.find_problems()
```

```
In [5]: 'HIMMELBA' in all_probs
```

```
Out[5]: True
```

```
In [6]: 'WAYSEA1NE' in all_probs
```

```
Out[6]: True
```

As demonstrated above, both problems are in `find_problem()` return, but cannot be properly imported.

## Problems with objective function call issue

```
In [7]: my_invalid = ['BEALENE', 'BOXBOD', 'BROWNBSNE', 'CLUSTER',
                    'DANIWOOD', 'DANWOOD', 'DENSCHNCNE', 'ELATVIDUNE',
                    'EXPFITNE', 'FBRAIN', 'FBRAINNE', 'GBRAIN', 'GOTTFR',
                    'HIMMELBC', 'HIMMELBD', 'HS1NE', 'HS8', 'HYPCIR',
                    'JENSMPNE', 'JUDGENE', 'MISRA1A', 'MISRA1B', 'MISRA1C',
                    'MISRA1D', 'POWELLBS', 'POWELLSQ', 'PRICE3NE',
                    'PRICE4NE', 'RSNBRNE', 'S308NE', 'SINVALNE', 'WAYSEA2NE']
```

```
In [8]: for invalid in my_invalid:

        print(invalid)

        prob = pct.import_problem(invalid)
        # examine the function value and gradient returned at initial p
        print(prob.obj(prob.x0, gradient=True))
        # examine the function value and gradient returned close to ini
        print(prob.obj(np.array([prob.x0[0]+1, prob.x0[1]+1]), gradient:
```

```
BEALENE
(0.0, array([0., 0.]))
(0.0, array([0., 0.]))
BOXBOD
(0.0, array([0., 0.]))
(0.0, array([0., 0.]))
BROWNBSNE
(0.0, array([0., 0.]))
(0.0, array([0., 0.]))
CLUSTER
(0.0, array([0., 0.]))
(0.0, array([0., 0.]))
DANIWOOD
(0.0, array([0., 0.]))
(0.0, array([0., 0.]))
DANWOOD
(0.0, array([0., 0.]))
(0.0, array([0., 0.]))
DENSCHNCNE
(0.0, array([0., 0.]))
(0.0, array([0., 0.]))
ELATVIDUNE
(0.0, array([0., 0.]))
(0.0, array([0., 0.]))
EXPFITNE
(0.0, array([0., 0.]))
(0.0, array([0., 0.]))
FBRAIN
(0.0, array([0., 0.]))
(0.0, array([0., 0.]))
FBRAINNE
(0.0, array([0., 0.]))
(0.0, array([0., 0.]))
GBRAIN
(0.0, array([0., 0.]))
(0.0, array([0., 0.]))
GOTTFR
(0.0, array([0., 0.]))
```

(0.0, array([0., 0.]))  
HIMMELBC  
(0.0, array([0., 0.]))  
(0.0, array([0., 0.]))  
HIMMELBD  
(0.0, array([0., 0.]))  
(0.0, array([0., 0.]))  
HS1NE  
(0.0, array([0., 0.]))  
(0.0, array([0., 0.]))  
HS8  
(-1.0, array([0., 0.]))  
(-1.0, array([0., 0.]))  
HYPCIR  
(0.0, array([0., 0.]))  
(0.0, array([0., 0.]))  
JENSMPNE  
(0.0, array([0., 0.]))  
(0.0, array([0., 0.]))  
JUDGENE  
(0.0, array([0., 0.]))  
(0.0, array([0., 0.]))  
MISRA1A  
(0.0, array([0., 0.]))  
(0.0, array([0., 0.]))  
MISRA1B  
(0.0, array([0., 0.]))  
(0.0, array([0., 0.]))  
MISRA1C  
(0.0, array([0., 0.]))  
(0.0, array([0., 0.]))  
MISRA1D  
(0.0, array([0., 0.]))  
(0.0, array([0., 0.]))  
POWELLBS  
(0.0, array([0., 0.]))  
(0.0, array([0., 0.]))  
POWELLSQ  
(0.0, array([0., 0.]))  
(0.0, array([0., 0.]))  
PRICE3NE  
(0.0, array([0., 0.]))  
(0.0, array([0., 0.]))  
PRICE4NE  
(0.0, array([0., 0.]))  
(0.0, array([0., 0.]))  
RSNBRNE  
(0.0, array([0., 0.]))  
(0.0, array([0., 0.]))  
S308NE  
(0.0, array([0., 0.]))  
(0.0, array([0., 0.]))  
SINVALNE  
(0.0, array([0., 0.]))  
(0.0, array([0., 0.]))  
WAYSEA2NE  
(0.0, array([0., 0.]))

```
(0.0, array([0., 0.]))
```

From the above code we can see that all problems has objective function value equals 0 (-1 for HS8) at the initial point  $x_0$  provided. All problems also have constant gradient of 0, which I assume shall not be the case.