

# notebook

July 20, 2023

```
[ ]: import os
os.chdir("../..")
print("current working directory: " + os.getcwd())
```

```
current working directory:
c:\Users\bcynuaa\Desktop\LocalProject\Help\CFDPostFlutterHelp\CODE\AoABuffet-
FluentBackend
```

```
[ ]: from src.classes.AoAFinder import AoAFinder
aoa_finder: AoAFinder = AoAFinder()
```

```
config: FluentSettings.py loaded
config: CalculationSettings.py loaded
config: AoAFinderSettings.py loaded
utils: Path.py loaded
decorator: Clock.py is imported.
classes: CalculationTask.py loaded
classes: AoAFinder.py loaded
```

```
[ ]: mesh_filename: str = "C://AoABuffet-FluentBackend//Mesh//001t010.cas"
mach: float = 0.74
aoa_finder.setMeshFilename(mesh_filename)
aoa_finder.setMach(mach)
save_path: str = "examples//001t010mach0.74/"
```

```
[ ]: aoa_finder.autoCalculate()
```

```
task folder created: C://AoABuffet-
FluentBackend//Data\001t010\mach_0.740\AoA_0.500
tui commands written: C://AoABuffet-
FluentBackend//Data\001t010\mach_0.740\AoA_0.500\start.jou
task finished with return code: 0
mach: 0.74, AoA: 0.50, CL: 0.5531, CD: 0.0096
Function autoCalculate costs 130.57991647720337 seconds.
```

```
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--
```

```
task folder created: C://AoABuffet-
FluentBackend//Data\001t010\mach_0.740\AoA_0.600
```

```

tui commands written: C://AoABuffet-
FluentBackend//Data\001t010\mach_0.740\AoA_0.600\start.jou
task finished with return code: 0
mach: 0.74, AoA: 0.60, CL: 0.5706, CD: 0.0104
Function autoCalculate costs 138.44424724578857 seconds.
-----
--
task folder created: C://AoABuffet-
FluentBackend//Data\001t010\mach_0.740\AoA_0.700
tui commands written: C://AoABuffet-
FluentBackend//Data\001t010\mach_0.740\AoA_0.700\start.jou
task finished with return code: 0
mach: 0.74, AoA: 0.70, CL: 0.5894, CD: 0.0105
Function autoCalculate costs 133.2268626689911 seconds.
-----
--
Clalpha0: 0.1814
Function calculateClalpha0 costs 402.25402760505676 seconds.
-----
--
task folder created: C://AoABuffet-
FluentBackend//Data\001t010\mach_0.740\AoA_1.500
tui commands written: C://AoABuffet-
FluentBackend//Data\001t010\mach_0.740\AoA_1.500\start.jou
task finished with return code: 0
mach: 0.74, AoA: 1.50, CL: 0.7468, CD: 0.0120
Function autoCalculate costs 115.26175618171692 seconds.
-----
--
Clalpha0: 0.1814
current min Clalpha: 0.1748
task folder created: C://AoABuffet-
FluentBackend//Data\001t010\mach_0.740\AoA_2.500
tui commands written: C://AoABuffet-
FluentBackend//Data\001t010\mach_0.740\AoA_2.500\start.jou
task finished with return code: 0
mach: 0.74, AoA: 2.50, CL: 0.9700, CD: 0.0226
Function autoCalculate costs 120.79235816001892 seconds.
-----
--
Clalpha0: 0.1814
current min Clalpha: 0.1748
task folder created: C://AoABuffet-
FluentBackend//Data\001t010\mach_0.740\AoA_3.500
tui commands written: C://AoABuffet-
FluentBackend//Data\001t010\mach_0.740\AoA_3.500\start.jou
task finished with return code: 0
mach: 0.74, AoA: 3.50, CL: 1.0626, CD: 0.0414

```

Function autoCalculate costs 148.74611735343933 seconds.

-----  
--

Clalpha0: 0.1814  
current min Clalpha: 0.0926  
task folder created: C://AoABuffet-  
FluentBackend//Data\001t010\mach\_0.740\AoA\_4.500  
tui commands written: C://AoABuffet-  
FluentBackend//Data\001t010\mach\_0.740\AoA\_4.500\start.jou  
task finished with return code: 0  
mach: 0.74, AoA: 4.50, CL: 1.0492, CD: 0.0590  
Function autoCalculate costs 138.6732783317566 seconds.

-----  
--

Clalpha0: 0.1814  
current min Clalpha: -0.0135  
Function locateWhereBuffet costs 523.4790110588074 seconds.

-----  
--

AoA lhs: 2.5000, AoA rhs: 3.5000  
task folder created: C://AoABuffet-  
FluentBackend//Data\001t010\mach\_0.740\AoA\_3.000  
tui commands written: C://AoABuffet-  
FluentBackend//Data\001t010\mach\_0.740\AoA\_3.000\start.jou  
task finished with return code: 0  
mach: 0.74, AoA: 3.00, CL: 1.0318, CD: 0.0321  
Function autoCalculate costs 118.99305772781372 seconds.

-----  
--

AoA lhs: 3.0000, AoA rhs: 3.5000  
task folder created: C://AoABuffet-  
FluentBackend//Data\001t010\mach\_0.740\AoA\_3.250  
tui commands written: C://AoABuffet-  
FluentBackend//Data\001t010\mach\_0.740\AoA\_3.250\start.jou  
task finished with return code: 0  
mach: 0.74, AoA: 3.25, CL: 1.0494, CD: 0.0367  
Function autoCalculate costs 126.95687556266785 seconds.

-----  
--

AoA lhs: 3.0000, AoA rhs: 3.2500  
task folder created: C://AoABuffet-  
FluentBackend//Data\001t010\mach\_0.740\AoA\_3.125  
tui commands written: C://AoABuffet-  
FluentBackend//Data\001t010\mach\_0.740\AoA\_3.125\start.jou  
task finished with return code: 0  
mach: 0.74, AoA: 3.12, CL: 1.0409, CD: 0.0344  
Function autoCalculate costs 121.07713866233826 seconds.

-----

```
--
AoA lhs: 3.0000, AoA rhs: 3.1250
task folder created: C://AoABuffet-
FluentBackend//Data\001t010\mach_0.740\AoA_3.062
tui commands written: C://AoABuffet-
FluentBackend//Data\001t010\mach_0.740\AoA_3.062\start.jou
task finished with return code: 0
mach: 0.74, AoA: 3.06, CL: 1.0364, CD: 0.0333
Function autoCalculate costs 120.37758564949036 seconds.
```

```
-----
--
AoA lhs: 2.5000, AoA rhs: 3.0000
task folder created: C://AoABuffet-
FluentBackend//Data\001t010\mach_0.740\AoA_2.750
tui commands written: C://AoABuffet-
FluentBackend//Data\001t010\mach_0.740\AoA_2.750\start.jou
task finished with return code: 0
mach: 0.74, AoA: 2.75, CL: 1.0103, CD: 0.0273
Function autoCalculate costs 124.86486744880676 seconds.
```

```
-----
--
AoA lhs: 2.7500, AoA rhs: 3.0000
task folder created: C://AoABuffet-
FluentBackend//Data\001t010\mach_0.740\AoA_2.875
tui commands written: C://AoABuffet-
FluentBackend//Data\001t010\mach_0.740\AoA_2.875\start.jou
task finished with return code: 0
mach: 0.74, AoA: 2.88, CL: 1.0209, CD: 0.0298
Function autoCalculate costs 120.49129366874695 seconds.
```

```
-----
--
AoA lhs: 2.8750, AoA rhs: 3.0000
task folder created: C://AoABuffet-
FluentBackend//Data\001t010\mach_0.740\AoA_2.938
tui commands written: C://AoABuffet-
FluentBackend//Data\001t010\mach_0.740\AoA_2.938\start.jou
task finished with return code: 0
mach: 0.74, AoA: 2.94, CL: 1.0270, CD: 0.0310
Function autoCalculate costs 125.25852799415588 seconds.
```

```
-----
--
Function refineWhereBuffet costs 858.0353448390961 seconds.
```

```
-----
--
Function autoCalculate costs 1783.7683835029602 seconds.
```

```
[ ]: aoa_finder.dataframe
```

```
[ ]:      mach      AoA      CL      Clalpha      CD iterations \
0      0.74      0.5000      0.553116      0.174815      0.009623      2500
1      0.74      0.6000      0.570598      0.181415      0.010373      2500
2      0.74      0.7000      0.589399      0.188985      0.010453      2500
3      0.74      1.5000      0.746798      0.208514      0.011990      2500
4      0.74      2.5000      0.970019      0.173624      0.022631      2500
5      0.74      2.7500      1.010325      0.110224      0.027292      2500
6      0.74      2.8750      1.020916      0.092764      0.029833      2500
26     0.74      2.9375      1.026965      0.086833      0.030980      2500
7      0.74      3.0000      1.031770      0.075740      0.032120      2500
8      0.74      3.0625      1.036432      0.072750      0.033254      2500
9      0.74      3.1250      1.040864      0.069927      0.034408      2500
10     0.74      3.2500      1.049360      0.063003      0.036732      2500
11     0.74      3.5000      1.062625      0.039756      0.041445      2500
12     0.74      4.5000      1.049170      -0.013455      0.058966      2500
```

```
cmd \
0      C://SoftWare//Ansys//ANSYS Inc//v222//fluent//...
1      C://SoftWare//Ansys//ANSYS Inc//v222//fluent//...
2      C://SoftWare//Ansys//ANSYS Inc//v222//fluent//...
3      C://SoftWare//Ansys//ANSYS Inc//v222//fluent//...
4      C://SoftWare//Ansys//ANSYS Inc//v222//fluent//...
5      C://SoftWare//Ansys//ANSYS Inc//v222//fluent//...
6      C://SoftWare//Ansys//ANSYS Inc//v222//fluent//...
26     C://SoftWare//Ansys//ANSYS Inc//v222//fluent//...
7      C://SoftWare//Ansys//ANSYS Inc//v222//fluent//...
8      C://SoftWare//Ansys//ANSYS Inc//v222//fluent//...
9      C://SoftWare//Ansys//ANSYS Inc//v222//fluent//...
10     C://SoftWare//Ansys//ANSYS Inc//v222//fluent//...
11     C://SoftWare//Ansys//ANSYS Inc//v222//fluent//...
12     C://SoftWare//Ansys//ANSYS Inc//v222//fluent//...
```

```
task folder \
0      C://AoABuffet-FluentBackend//Data\001t010\mach...
1      C://AoABuffet-FluentBackend//Data\001t010\mach...
2      C://AoABuffet-FluentBackend//Data\001t010\mach...
3      C://AoABuffet-FluentBackend//Data\001t010\mach...
4      C://AoABuffet-FluentBackend//Data\001t010\mach...
5      C://AoABuffet-FluentBackend//Data\001t010\mach...
6      C://AoABuffet-FluentBackend//Data\001t010\mach...
26     C://AoABuffet-FluentBackend//Data\001t010\mach...
7      C://AoABuffet-FluentBackend//Data\001t010\mach...
8      C://AoABuffet-FluentBackend//Data\001t010\mach...
9      C://AoABuffet-FluentBackend//Data\001t010\mach...
10     C://AoABuffet-FluentBackend//Data\001t010\mach...
```

```

11 C://AoABuffet-FluentBackend//Data\001t010\mach...
12 C://AoABuffet-FluentBackend//Data\001t010\mach...

```

```

read case filename \

```

```

0 C://AoABuffet-FluentBackend//Mesh//001t010.cas
1 C://AoABuffet-FluentBackend//Mesh//001t010.cas
2 C://AoABuffet-FluentBackend//Mesh//001t010.cas
3 C://AoABuffet-FluentBackend//Mesh//001t010.cas
4 C://AoABuffet-FluentBackend//Mesh//001t010.cas
5 C://AoABuffet-FluentBackend//Mesh//001t010.cas
6 C://AoABuffet-FluentBackend//Mesh//001t010.cas
26 C://AoABuffet-FluentBackend//Mesh//001t010.cas
7 C://AoABuffet-FluentBackend//Mesh//001t010.cas
8 C://AoABuffet-FluentBackend//Mesh//001t010.cas
9 C://AoABuffet-FluentBackend//Mesh//001t010.cas
10 C://AoABuffet-FluentBackend//Mesh//001t010.cas
11 C://AoABuffet-FluentBackend//Mesh//001t010.cas
12 C://AoABuffet-FluentBackend//Mesh//001t010.cas

```

```

write case filename \

```

```

0 C://AoABuffet-FluentBackend//Data\001t010\mach...
1 C://AoABuffet-FluentBackend//Data\001t010\mach...
2 C://AoABuffet-FluentBackend//Data\001t010\mach...
3 C://AoABuffet-FluentBackend//Data\001t010\mach...
4 C://AoABuffet-FluentBackend//Data\001t010\mach...
5 C://AoABuffet-FluentBackend//Data\001t010\mach...
6 C://AoABuffet-FluentBackend//Data\001t010\mach...
26 C://AoABuffet-FluentBackend//Data\001t010\mach...
7 C://AoABuffet-FluentBackend//Data\001t010\mach...
8 C://AoABuffet-FluentBackend//Data\001t010\mach...
9 C://AoABuffet-FluentBackend//Data\001t010\mach...
10 C://AoABuffet-FluentBackend//Data\001t010\mach...
11 C://AoABuffet-FluentBackend//Data\001t010\mach...
12 C://AoABuffet-FluentBackend//Data\001t010\mach...

```

```

cd report filename \

```

```

0 C://AoABuffet-FluentBackend//Data\001t010\mach...
1 C://AoABuffet-FluentBackend//Data\001t010\mach...
2 C://AoABuffet-FluentBackend//Data\001t010\mach...
3 C://AoABuffet-FluentBackend//Data\001t010\mach...
4 C://AoABuffet-FluentBackend//Data\001t010\mach...
5 C://AoABuffet-FluentBackend//Data\001t010\mach...
6 C://AoABuffet-FluentBackend//Data\001t010\mach...
26 C://AoABuffet-FluentBackend//Data\001t010\mach...
7 C://AoABuffet-FluentBackend//Data\001t010\mach...
8 C://AoABuffet-FluentBackend//Data\001t010\mach...
9 C://AoABuffet-FluentBackend//Data\001t010\mach...

```

```

10 C://AoABuffet-FluentBackend//Data\001t010\mach...
11 C://AoABuffet-FluentBackend//Data\001t010\mach...
12 C://AoABuffet-FluentBackend//Data\001t010\mach...

```

cl report filename \

```

0 C://AoABuffet-FluentBackend//Data\001t010\mach...
1 C://AoABuffet-FluentBackend//Data\001t010\mach...
2 C://AoABuffet-FluentBackend//Data\001t010\mach...
3 C://AoABuffet-FluentBackend//Data\001t010\mach...
4 C://AoABuffet-FluentBackend//Data\001t010\mach...
5 C://AoABuffet-FluentBackend//Data\001t010\mach...
6 C://AoABuffet-FluentBackend//Data\001t010\mach...
26 C://AoABuffet-FluentBackend//Data\001t010\mach...
7 C://AoABuffet-FluentBackend//Data\001t010\mach...
8 C://AoABuffet-FluentBackend//Data\001t010\mach...
9 C://AoABuffet-FluentBackend//Data\001t010\mach...
10 C://AoABuffet-FluentBackend//Data\001t010\mach...
11 C://AoABuffet-FluentBackend//Data\001t010\mach...
12 C://AoABuffet-FluentBackend//Data\001t010\mach...

```

tui commands filename return code

```

0 C://AoABuffet-FluentBackend//Data\001t010\mach... 0
1 C://AoABuffet-FluentBackend//Data\001t010\mach... 0
2 C://AoABuffet-FluentBackend//Data\001t010\mach... 0
3 C://AoABuffet-FluentBackend//Data\001t010\mach... 0
4 C://AoABuffet-FluentBackend//Data\001t010\mach... 0
5 C://AoABuffet-FluentBackend//Data\001t010\mach... 0
6 C://AoABuffet-FluentBackend//Data\001t010\mach... 0
26 C://AoABuffet-FluentBackend//Data\001t010\mach... 0
7 C://AoABuffet-FluentBackend//Data\001t010\mach... 0
8 C://AoABuffet-FluentBackend//Data\001t010\mach... 0
9 C://AoABuffet-FluentBackend//Data\001t010\mach... 0
10 C://AoABuffet-FluentBackend//Data\001t010\mach... 0
11 C://AoABuffet-FluentBackend//Data\001t010\mach... 0
12 C://AoABuffet-FluentBackend//Data\001t010\mach... 0

```

```

[ ]: aoa_finder.drawAoACL()
    aoa_finder.figure_AoACL.show()

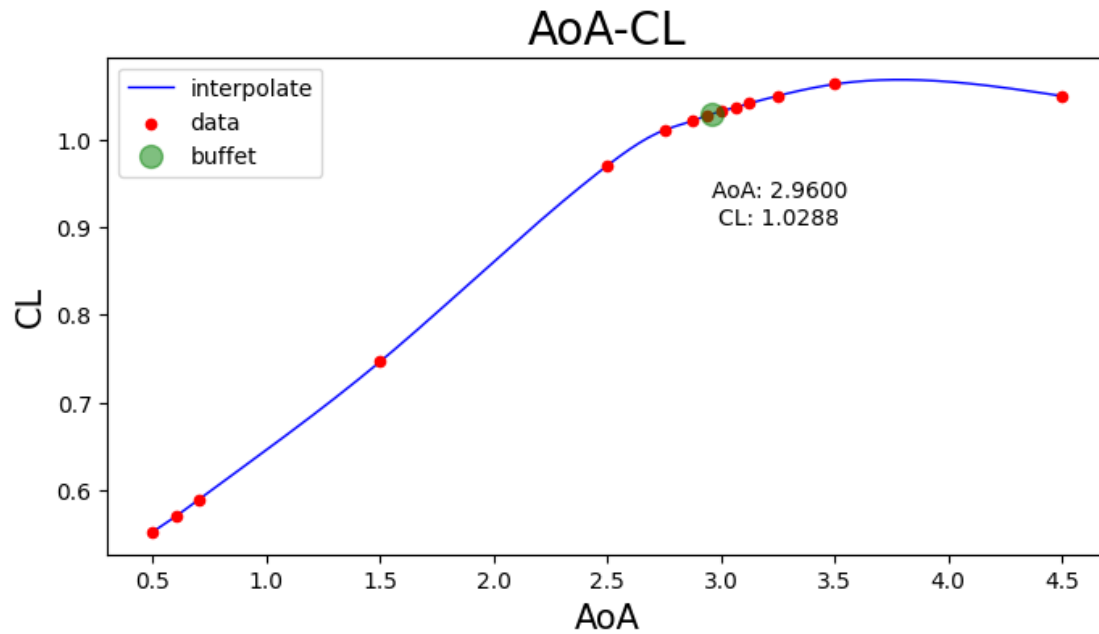
```

C:\Users\bcynuaa\AppData\Local\Temp\ipykernel\_15528\1100355274.py:2:

UserWarning: Matplotlib is currently using

module://matplotlib\_inline.backend\_inline, which is a non-GUI backend, so cannot show the figure.

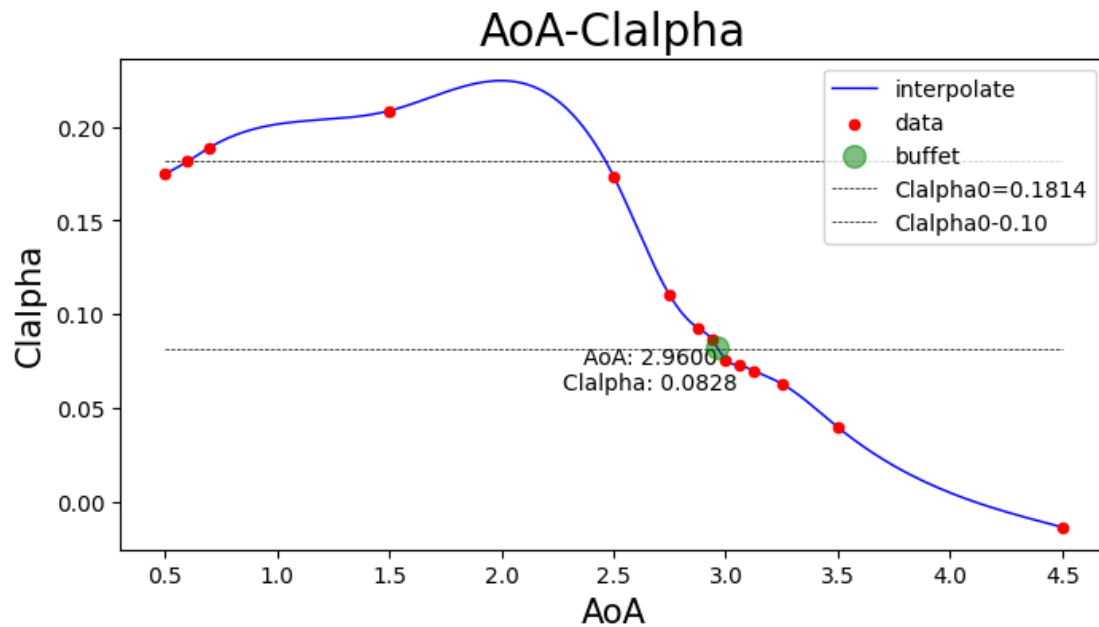
```
    aoa_finder.figure_AoACL.show()
```



```
[ ]: aoa_finder.drawAoAClalpha()
      aoa_finder.figure_AoAClalpha.show()
```

C:\Users\bcynuaa\AppData\Local\Temp\ipykernel\_15528\508962497.py:2: UserWarning: Matplotlib is currently using module://matplotlib\_inline.backend\_inline, which is a non-GUI backend, so cannot show the figure.

```
      aoa_finder.figure_AoAClalpha.show()
```





```
[ ]: aoa_finder.dataframe.to_csv(os.path.join(save_path, "dataframe.csv"),  
    ↪ index=False)  
    aoa_finder.figure_AoACL.savefig(os.path.join(save_path, "AoACL.png"))  
    aoa_finder.figure_AoAClalpha.savefig(os.path.join(save_path, "AoAClalpha.png"))
```