Hypothetical-Plant

June 6, 2022

[2]:
```
%load_ext autoreload
%autoreload 2
```

[3]:
```
import sys
import json
import numpy as np
import matplotlib.pyplot as plt
import matplotlib.patches as patches
import pandas as pd
```

[4]:
```
sys.path.insert(1, '../src')
from plant import Plant
from sun import Sun
from state import State
from run import *
plt.rcParams['figure.figsize'] = [20, 10]
```

1 Hypothetical Plant with Basic Layouts

[5]:
```
plant = Plant(heli_layout_file_name="../data/layouts/hexagon-layout.json")
print(plant)
```

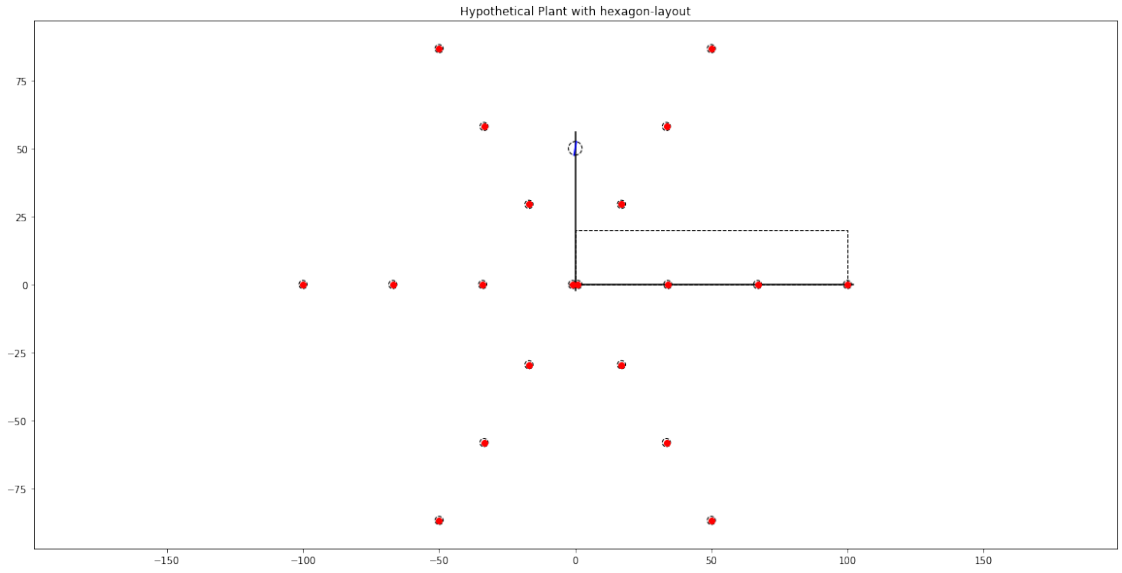
```
Hypothetical Plant:

        - field area:
                - [x_min, x_max] = [0.00, 100.00]
                - [y_min, y_max] = [0.00, 20.00]
                - diameter = 101.98
                - max_ij = 0.00

        - receiver:
                - _height = 50.00
                - _angle = 80.00
                - _size = 5.00

        - heliostats:
                - number of heliostats n = 20.00
```

```
- heli_size = 3.00
- heli_rays = 5.00
- heli_layout = hexagon-layout
```

[6]:
```
plant.check_layout()
```

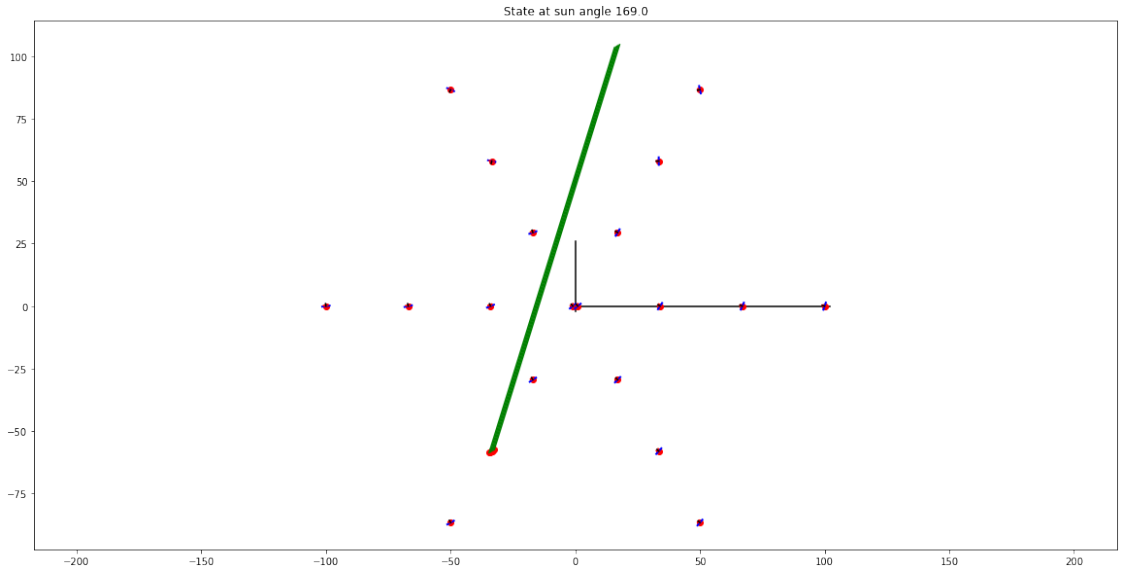
[6]:
```
False
```

[7]:
```
plant.draw()
```



[8]:
```
sun = Sun()
state = State(plant, sun_angle=sun.angles[15])
effects = state.get_effects(i=10, verbose=True)
state.draw(i=10)
```

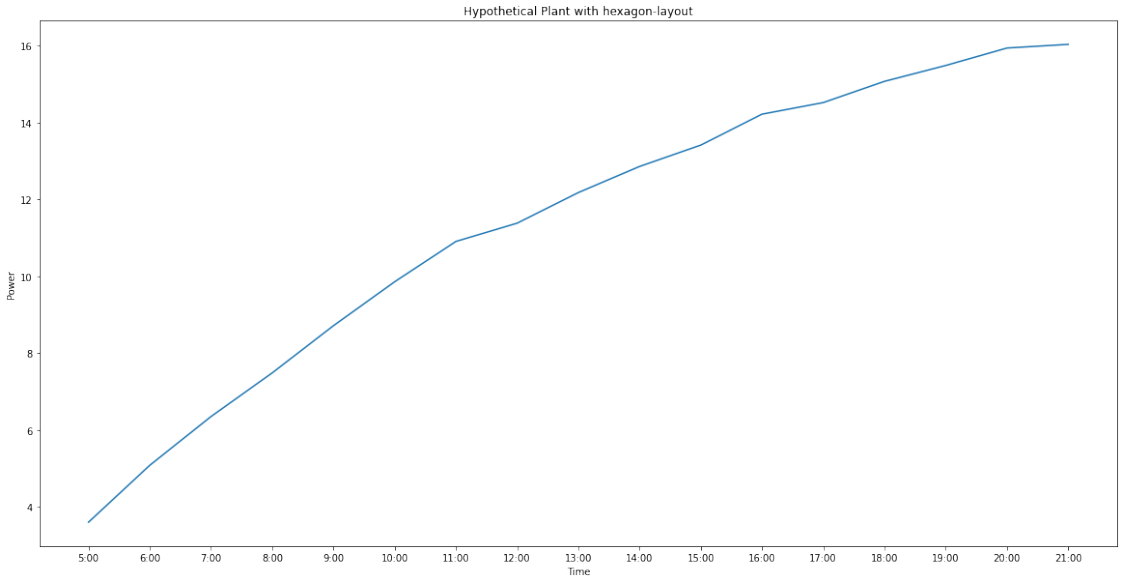
```
Effects on heliostat 10:

        * eta_aa = 0.980308
        * eta_cos = 0.991082
        * eta_sbm = 0.200000
        * received_rays / all_rays = 1 / 5
        * [not-shaded, not-blocked, not-missed] / all_rays = [5 5 1] / 5
```



[9]:
```
energy, stats_df, powers = get_energy(plant, show_stats=True)
```

```
Hypothetical Plant with hexagon-layout

        - energy = 193.04699302633676438745

                 mu_aa   mu_cos  mu_sbm
        - etas:  0.9803, 0.7556, 0.7682

                 pi_sha  pi_blo  pi_mis
        - sbms:  0.0000, 0.0224, 0.2271
```

[10]:
```
draw(plant, powers)
```



[11]:
```
stats_df
```

[11]:

	time	power	mu_aa	mu_cos	mu_sbm	pi_sha	pi_blo	pi_mis
0	5:00	3.603659	0.980308	0.229753	0.80	0.0	0.00	0.20
1	6:00	5.082571	0.980308	0.324042	0.80	0.0	0.01	0.20
2	7:00	6.349723	0.980308	0.415210	0.78	0.0	0.02	0.22
3	8:00	7.485792	0.980308	0.502379	0.76	0.0	0.02	0.24
4	9:00	8.712583	0.980308	0.584710	0.76	0.0	0.02	0.24
5	10:00	9.855467	0.980308	0.661410	0.76	0.0	0.03	0.24
6	11:00	10.903438	0.980308	0.731741	0.76	0.0	0.03	0.24
7	12:00	11.378781	0.980308	0.795024	0.73	0.0	0.04	0.26
8	13:00	12.174939	0.980308	0.850651	0.73	0.0	0.04	0.26
9	14:00	12.853846	0.980308	0.898085	0.73	0.0	0.04	0.26
10	15:00	13.408963	0.980308	0.936871	0.73	0.0	0.03	0.26
11	16:00	14.213985	0.980308	0.966634	0.75	0.0	0.03	0.24
12	17:00	14.514748	0.980308	0.987087	0.75	0.0	0.02	0.24
13	18:00	15.067080	0.980308	0.998035	0.77	0.0	0.02	0.22
14	19:00	15.479124	0.980308	0.999371	0.79	0.0	0.02	0.20
15	20:00	15.933683	0.980308	0.991082	0.82	0.0	0.01	0.18
16	21:00	16.028610	0.980308	0.973249	0.84	0.0	0.00	0.16

[ ]:
```

```