# Quarto Basics

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### Polar Axis

For a demonstration of a line plot on a polar axis, see Figure 1.

```
import numpy as np
import matplotlib.pyplot as plt

r = np.arange(0, 2, 0.01)
theta = 34 * np.pi * r
fig, ax = plt.subplots(
  subplot_kw = {'projection': 'polar'}
)
ax.plot(theta, r)
ax.set_rticks([0.5, 1, 1.5, 2])
ax.grid(True)
plt.show()
```

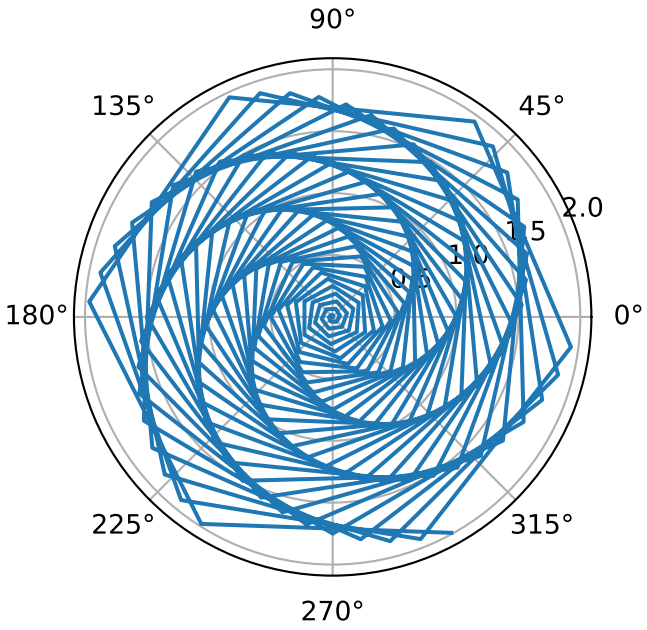



Figure 1: A line plot on a polar axis

This is some stated fact (Graham et al. 1989).

Use the following command to generate the requirements document. Make sure to exclude all Windows-related packages. I.e. Ctrl + F > "win" and delete all hits.

```
pip freeze > requirements.txt
```

## Placing Colorbars

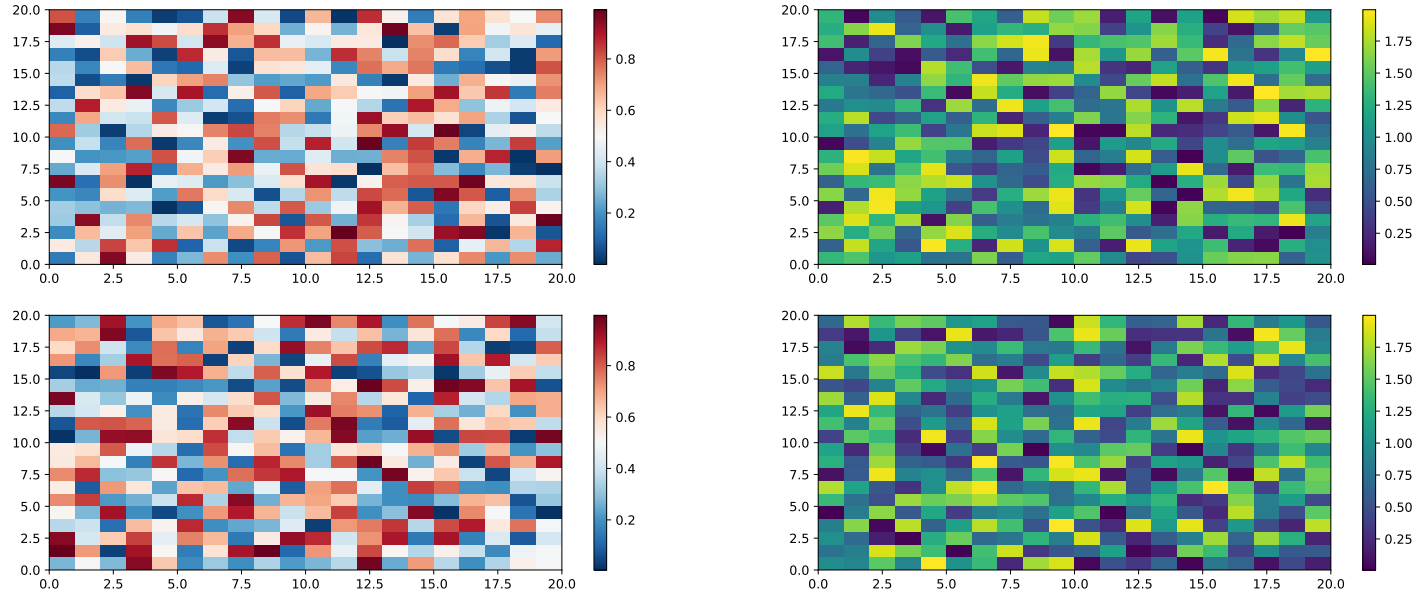
Colorbars indicate the quantitative extent of image data. Placing in a figure is non-trivial because room needs to be made for them. The simplest case is just attaching a colorbar to each axes:[1].

[1] See the Matplotlib Gallery to explore colorbars further

```
import matplotlib.pyplot as plt
import numpy as np

fig, axs = plt.subplots(2, 2)
fig.set_size_inches(20, 8)
cmaps = ['RdBu_r', 'viridis']
for col in range(2):
    for row in range(2):
        ax = axs[row, col]
        pcm = ax.pcolormesh(
          np.random.random((20, 20)) * (col + 1),
```

```
            cmap=cmaps[col]
        )
        fig.colorbar(pcm, ax=ax)
plt.show()
```



## Widgets

```
from ipyleaflet import Map, Marker, basemaps, basemap_to_tiles
m = Map(
  basemap=basemap_to_tiles(
    basemaps.NASAGIBS.ModisTerraTrueColorCR, "2017-04-08"
  ),
  center=(52.204793, 360.121558),
  zoom=4
)
m.add_layer(Marker(location=(52.204793, 360.121558)))
m
```

```
Map(center=[52.204793, 360.121558], controls=(ZoomControl(options=['position', 'zoom_in_text', 'z
```

## References


Graham, Ronald L, Donald E Knuth, Oren Patashnik, and Stanley Liu. 1989. "Concrete Mathematics: A Foundation for Computer Science." *Computers in Physics* 3 (5): 106–7.