Matplotlib for intermediate users

A matplotlib figure is composed of a hierarchy of elements that forms the actual figure. Each element can be modified.

Figure, axes & spines

```python
fig, axs = plt.subplots(3,3)
axs[0,0].set_facecolor("#ddddff")
axs[2,2].set_facecolor("#ffffdd")
```

```python
fig, axs = plt.subplots()
ax.set_facecolor("#ddddff")
```

```python
fig, ax = plt.subplots()
ax.set_facecolor("#ddddff")
```

Scales & projections

```python
fig, ax = plt.subplots()
ax.set_yscale("log")
```

```python
ax.text(0, -1, r" Period \( \Phi \)"")
```

Colors

Any color can be used, but Matplotlib offers sets of colors:

```
C0  C1  C2  C3  C4  C5  C6  C7  C8  C9
0.0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
```

Size & DPI

Consider a square figure to be included in a two-columns A4 paper with 2cm margins on each side and a column separation of 1cm. The width of a figure is (21 - 2*2 - 1)/2 = 8cm. One inch being 2.54cm, figure size should be 3.15×3.15 in.

```python
fig = plt.figure(figsize=(3.15,3.15), dpi=50)
```

```python
plt.savefig("figure.pdf", dpi=600)
```

Legend

```python
ax.plot(X, np.sin(X), "C0", label="Sine")
ax.plot(X, np.cos(X), "C1", label="Cosine")
ax.legend(bbox_to_anchor=(0,1,1,.1), ncol=2,
mode="expand", loc="lower left")
```