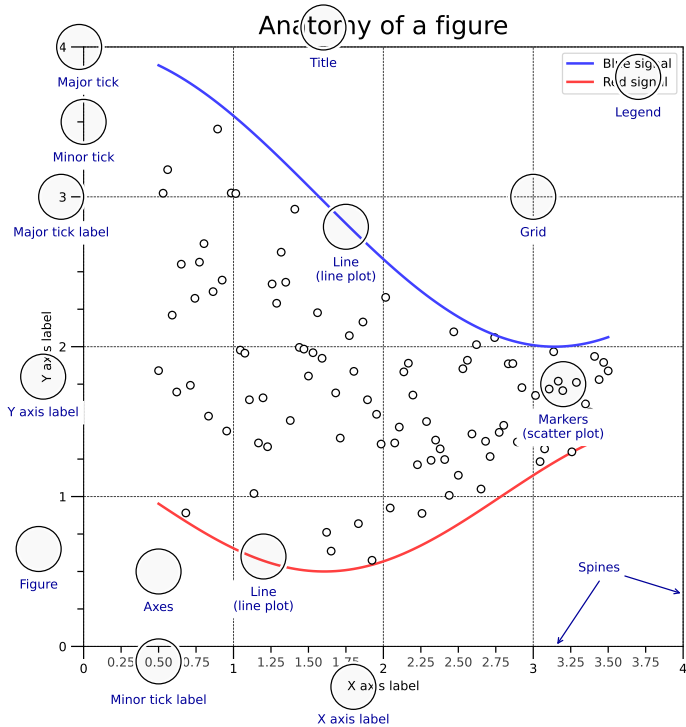


## Matplotlib para utilizadores de nível intermediário

Uma figura matplotlib é composta por uma hierarquia de elementos que formam a figura atual. Cada elemento pode ser modificado.



## Figure, axes & spines

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

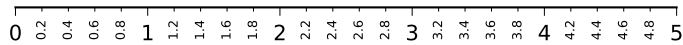
```
gs = fig.add_gridspec(3, 3)
ax = fig.add_subplot(gs[0, :])
ax.set_facecolor("#ddddff")
```

```
fig, ax = plt.subplots()
ax.spines["top"].set_color("None")
ax.spines["right"].set_color("None")
```



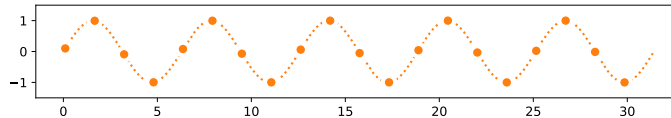
## Ticks & rótulos

```
from mpl.ticker import MultipleLocator as ML
from mpl.ticker import ScalarFormatter as SF
ax.xaxis.set_minor_locator(ML(0.2))
ax.xaxis.set_minor_formatter(SF())
ax.tick_params(axis='x', which='minor', rotation=90)
```



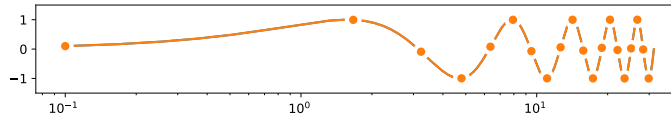
## Linhas & marcadores

```
X = np.linspace(0.1, 10*np.pi, 1000)
Y = np.sin(X)
ax.plot(X, Y, "C1o:", markevery=25, mec="1.0")
```



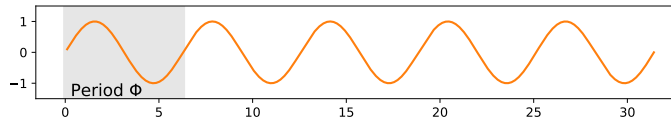
## Escalas & projeções

```
fig, ax = plt.subplots()
ax.set_xscale("log")
ax.plot(X, Y, "C1o-", markevery=25, mec="1.0")
```



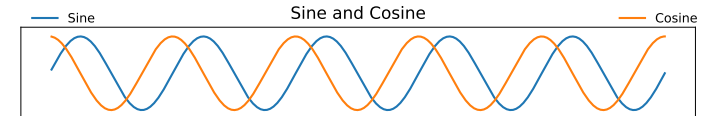
## Texto & ornamentos

```
ax.fill_betweenx([-1,1],[0],[2*np.pi])
ax.text(0, -1, r"Period $\Phi$")
```



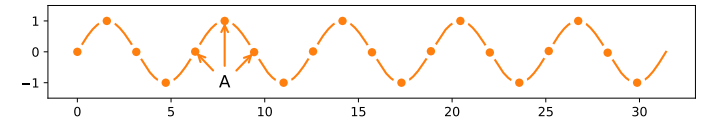
## Legenda

```
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")
```



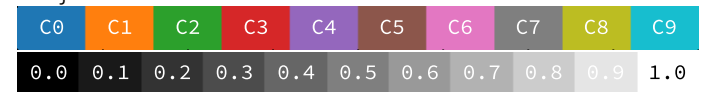
## Anotação

```
ax.annotate("A", (X[250],Y[250]),(X[250],-1),
            ha="center", va="center",arrowprops =
            {"arrowstyle" : "->", "color": "C1"})
```



## Cores

Qualquer cor pode ser usada, mas o Matplotlib oferece um conjunto de cores:



## Tamanho & DPI

Considere uma figura quadrada a ser incluída em uma folha de papel A4 de duas colunas com margem de 2cm em cada lado e uma coluna de separação de 1cm. A largura de um figura é  $(21 - 2 \times 2 - 1)/2 = 8\text{cm}$ . Uma polegada sendo 2.54cm, tamanho da figura deve ser  $3.15 \times 3.15\text{ in.}$

```
fig = plt.figure(figsize=(3.15,3.15), dpi=50)
plt.savefig("figure.pdf", dpi=600)
```

