

Programação com Python

Prof. Erneson A. Oliveira

MBA em Ciência de Dados
Universidade de Fortaleza

18 de Janeiro de 2020



FUNDAÇÃO EDSON QUEIROZ
UNIVERSIDADE DE FORTALEZA
ENSINANDO E APRENDENDO



DPDI - DIRETORIA DE PESQUISA,
DESENVOLVIMENTO E INOVAÇÃO

Aula 3 - Introdução à Python



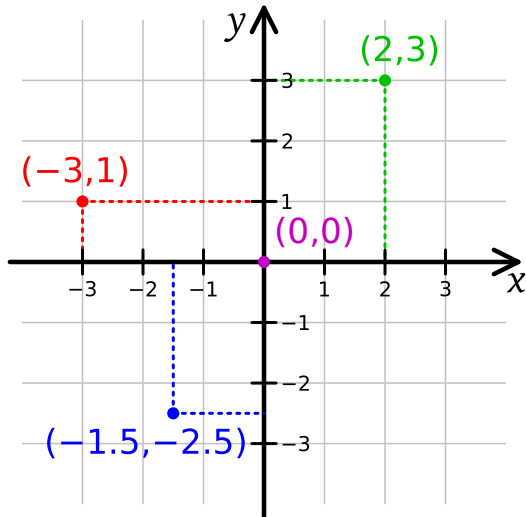
<http://www.python.org>

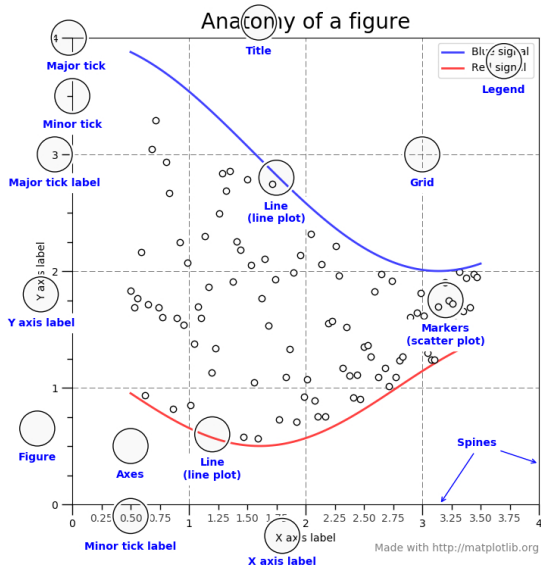


<http://www.matplotlib.org>

Matplotlib é *um módulo para produção de gráficos.*

Coordenadas Cartesianas





Gráficos de linha


```
1 import numpy as np
2 import matplotlib.pyplot as plt
3
4 x=np.linspace(0,2*np.pi,100)
5 y=np.sin(x)
6
7 plt.plot(x,y)
8 plt.show()
9
```

<https://matplotlib.org/tutorials/index.html>

```
1 import numpy as np
2 import matplotlib.pyplot as plt
3
4 x=np.linspace(0,2*np.pi,100)
5 y=np.sin(x)
6
7 fig ,ax=plt.subplots(figsize=(10,7))
8 ax.plot(x,y)
9 plt.show()
```

```
1 import numpy as np
2 import matplotlib.pyplot as plt
3
4 x=np.linspace(0,2*np.pi,100)
5 y=np.sin(x)
6
7 fig ,ax=plt.subplots(nrows=2,ncols=3,figsize=(10,7))
8 ax[0,0].plot(x,y)
9 ax[0,1].plot(x,y)
10 ax[0,2].plot(x,y)
11 ax[1,0].plot(x,y)
12 ax[1,1].plot(x,y)
13 ax[1,2].plot(x,y)
14 plt.show()
15
```

```
1 import numpy as np
2 import matplotlib.pyplot as plt
3
4 x=np.linspace(0,2*np.pi,10)
5 y=np.sin(x)
6
7 plt.plot(x,y, 'bo-')
8
9 plt.xlabel('Eixo X')
10 plt.ylabel('Eixo Y')
11 plt.title('Meu grafico de linha')
12
13 plt.savefig('grafico.pdf')
14 plt.show()
15
```

```
1 import numpy as np
2 import matplotlib.pyplot as plt
3
4 x=np.linspace(0,2*np.pi,100)
5 y=np.sin(x)
6
7 plt.plot(x,y,color='blue', linestyle='solid', linewidth=1,label='Sen x
8 ')
9
10 y=np.cos(x)
11 plt.plot(x,y,color='#FF0000', linestyle='dashed', linewidth=4,label='
12 Cos x')
13
14 plt.legend(fontsize=15)
15 plt.xlabel('x',fontsize=30)
16 plt.ylabel('f(x)',fontsize=30)
17
18 plt.show()
```

Gráficos de dispersão

```
1 import numpy as np
2 import matplotlib.pyplot as plt
3
4 n=1000
5
6 x=np.random.rand(n)
7 y=np.random.normal(0,1,n)
8
9 plt.scatter(x,y)
10
11 plt.xlabel('x')
12 plt.ylabel('y')
13
14 plt.show()
15
```

```
1 import numpy as np
2 import matplotlib.pyplot as plt
3
4 n=100
5
6 x=np.random.rand(n)
7 y=np.random.rand(n)
8 cores=np.random.rand(n)
9 tamanhos=np.linspace(1,200,n)
10
11 mapa_de_cor=plt.cm.inferno # viridis ,plama ,jet
12 plt.scatter(x,y,cmap=mapa_de_cor,c=cores,s=tamanhos,alpha=0.8)
13
14 plt.xlabel('x')
15 plt.ylabel('y')
16
17 plt.show()
18
```


Histogramas

```
1 import numpy as np
2 import matplotlib.pyplot as plt
3
4 n=10
5 x=np.random.rand(n)
6
7 plt.hist(x)
8
9 plt.show()
10
```

```
1 import numpy as np
2 import matplotlib.pyplot as plt
3
4 n=100
5
6 x=np.random.normal(0,1,n)
7
8 n,bins,patches=plt.hist(x,bins='fd',density=True)
9
10 plt.show()
11
```

Gráfico de barra

```
1 import matplotlib.pyplot as plt
2
3 nomes=['Grupo A', 'Grupo B', 'Grupo C']
4 valores=[5, 10, 15]
5
6 c=plt.bar(nomes, valores)
7
8 plt.show()
9
```

```
1 import matplotlib.pyplot as plt
2
3 nomes=['Grupo A', 'Grupo B', 'Grupo C']
4 valores=[5, 10, 15]
5
6 c=plt.barh(nomes, valores)
7
8 plt.show()
9
```

```
1 import matplotlib.pyplot as plt
2
3 nomes=['Grupo A','Grupo B','Grupo C','Grupo D','Grupo E']
4
5 idade={'media_homens': [20,35,30,35,27], 'desvio_homens': [2,3,4,1,2],
        'media_mulheres': [25,32,34,20,25], 'desvio_mulheres': [3,5,2,3,3]}
6
7 c0=plt.bar(nomes, idade['media_homens'], yerr=idade['desvio_homens'],
            label='Homens')
8 c1=plt.bar(nomes, idade['media_mulheres'], bottom=idade['media_homens'],
            yerr=idade['desvio_mulheres'], label='Mulheres')
9
10 legend=plt.legend()
11
12 plt.show()
13
```

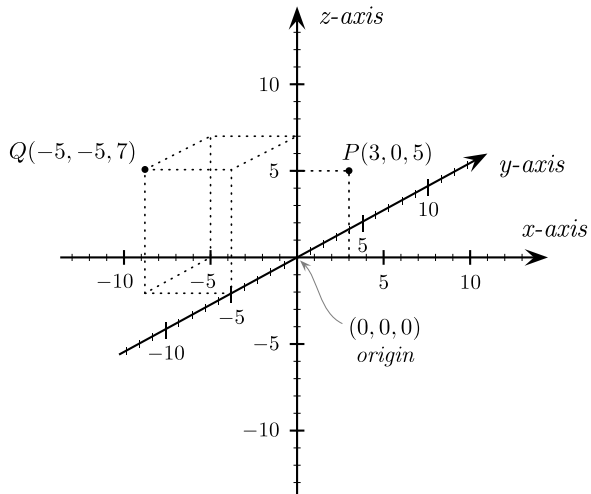
Gráficos de pizza


```
1 import matplotlib.pyplot as plt
2
3 rotulos=['Frogs','Hogs','Dogs','Logs']
4 percentagem=[15,30,45,10]
5 afastamento=[0,0,0.1,0]
6
7 p=plt.pie(percentagem,
8           explode=afastamento,
9           labels=rotulos)
10 a=plt.axis('equal')
11
12 plt.show()
13
```

Mapas de Calor

```
1 import numpy as np
2 import matplotlib.pyplot as plt
3
4 n=32
5 z=np.random.random((n,n))
6
7 fig , ax=plt.subplots(figsize=(10,10))
8
9 mapa_de_cor=plt.cm.viridis # inferno ,plama ,jet
10 ax.imshow(z,cmap=mapa_de_cor)
11 plt.show()
12
```

Gráficos 3D



```
1 import numpy as np
2 import matplotlib.pyplot as plt
3 from mpl_toolkits import mplot3d
4
5 fig=plt.figure()
6 ax=plt.axes(projection='3d')
7
8 z=np.linspace(0,15,1000)
9 x=np.sin(z)
10 y=np.cos(z)
11 ax.plot3D(x,y,z, 'gray')
12
13 z=15*np.random.random(100)
14 x=np.sin(z)+0.1*np.random.randn(100)
15 y=np.cos(z)+0.1*np.random.randn(100)
16 p=ax.scatter3D(x,y,z, c=z, cmap='jet')
17
18 plt.show()
19
```

```
1 import numpy as np
2 import matplotlib.pyplot as plt
3 from mpl_toolkits import mplot3d
4
5 X = np.arange(-5, 5, 0.25)
6 Y = np.arange(-5, 5, 0.25)
7 X, Y = np.meshgrid(X, Y)
8
9 R = np.sqrt(X**2 + Y**2)
10 Z = np.sin(R)
11
12 fig = plt.figure()
13 ax = plt.axes(projection='3d')
14 ax.plot_surface(X, Y, Z, rstride=1, cstride=1, cmap='viridis')
15
16 plt.show()
17
```

<https://docs.python.org/3/tutorial/index.html>

<http://www.matplotlib.org>

<https://youtu.be/eykoKxsYtow?list=PLeo1K3hjS3uslLfvyQlvUBokXkHPSve6S>