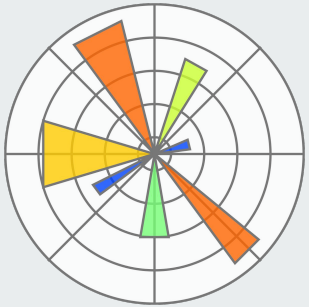
Python程式設計

科學繪圖工具 - Pyplot



官方網站: https://matplotlib.org/api/pyplot_api.html
教學網站: https://matplotlib.org/tutorials/introductory/pyplot.html

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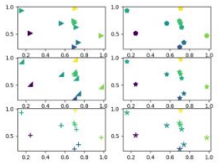
歷史版本

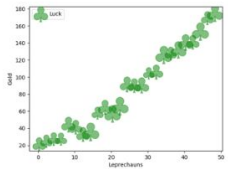
版本	說明	日期	負責人
v1.0	初版	2020/05/17	蘇維宗

為何要使用Pyplot?

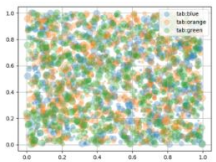
Pyplot是Python中類似於Matlab繪圖功能的套件，可以繪製的圖形種類非常多，是進行數值分析、影像處理、或人工智慧工作時不可或缺的工具。



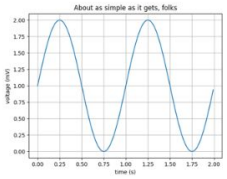
Scatter Star Poly



Scatter Symbol



Scatter plots with a legend

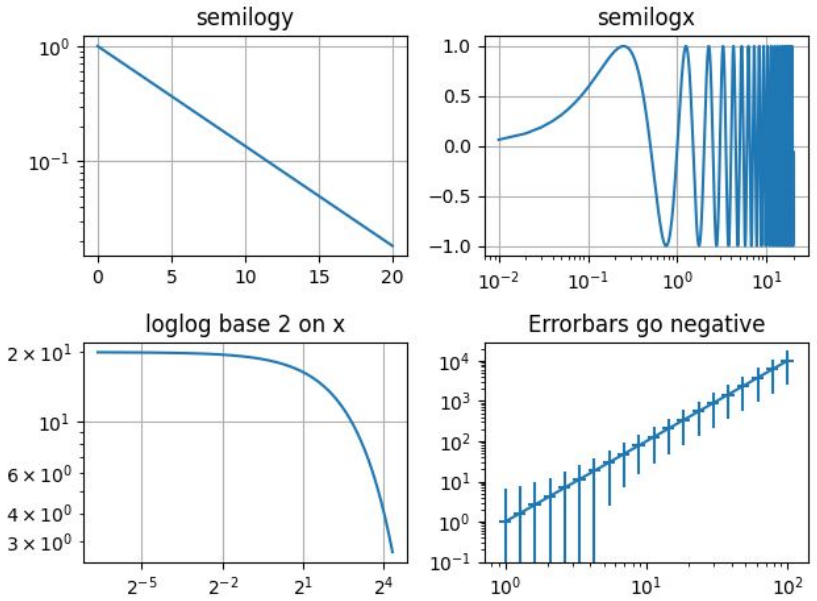


Simple Plot

Pyplot的圖形類別

Pyplot將資料繪製在Figure類別中，而在每個Figure物件上又可以產生多個Axes類別的物件來繪製多張圖。

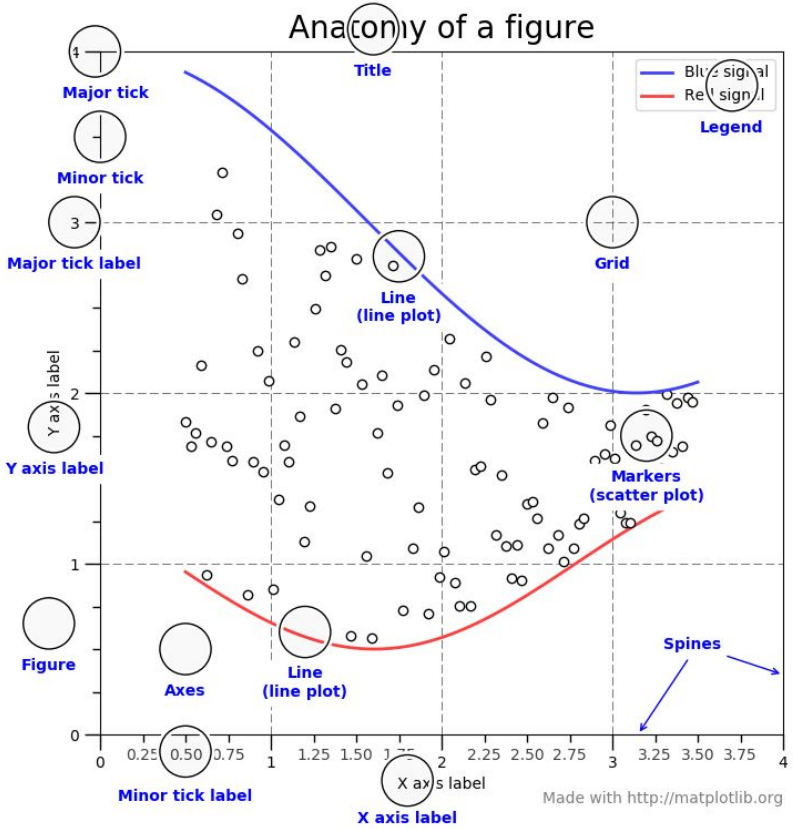
例如，右圖是一個Figure物件中包含了四個Axes物件。



Pyplot的圖形類別(續)

圖形包含的元素

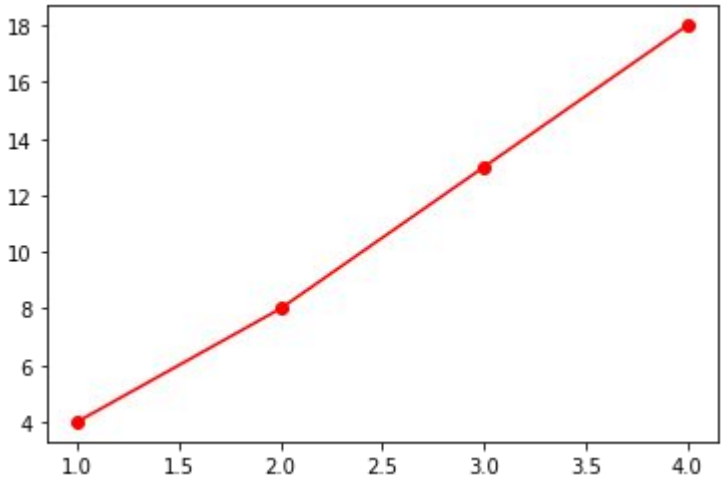
- Title (抬頭)
- Label (標籤)
- Grid (格線)
- Tick (刻度)
- Legend (圖例)



Pyplot程式的基本框架

Pyplot程式的基本框架如下

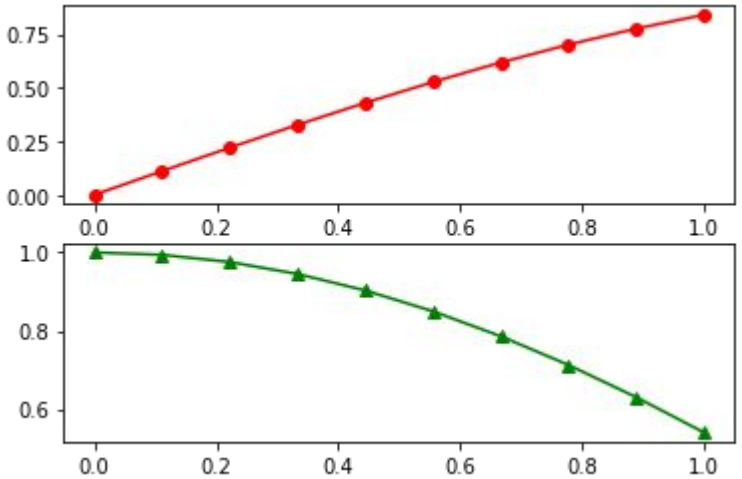
```
1.  import matplotlib.pyplot as plt
2.  # 產生單一Axe的圖形
3.  fig, axe = plt.subplots()
4.  # 在axe上繪製圖形
5.  X = [1,2,3,4]
6.  y = [4,8,13,18]
7.  axe.plot(X,y,'o-r')
8.  fig.show()
```



Pyplot程式的基本框架(續)

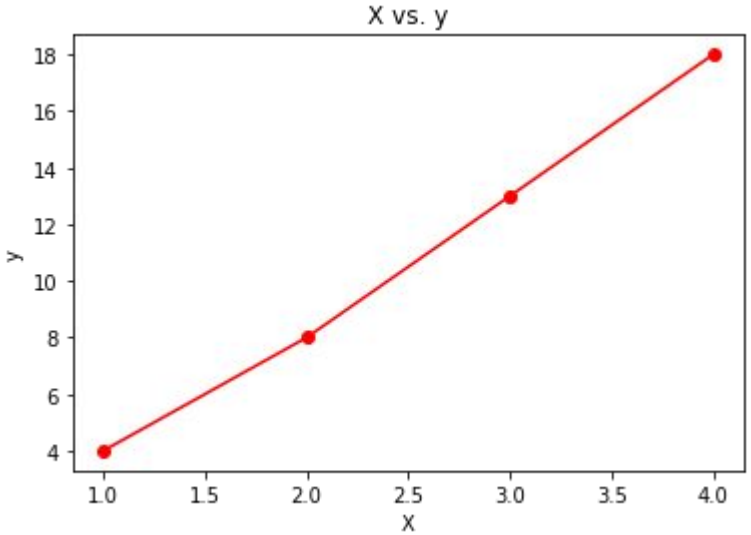
Pyplot程式的基本框架如下

```
1.  import numpy as np
2.  import matplotlib.pyplot as plt
3.  # 產生2x1個Axe的圖形
4.  fig, axes = plt.subplots(2,1)
5.  X = np.array([1,2,3,4])
6.  axes[0].plot(X,np.sin(X),'o-r')
7.  axes[1].plot(X,np.cos(X),'^-g')
8.  fig.show()
```



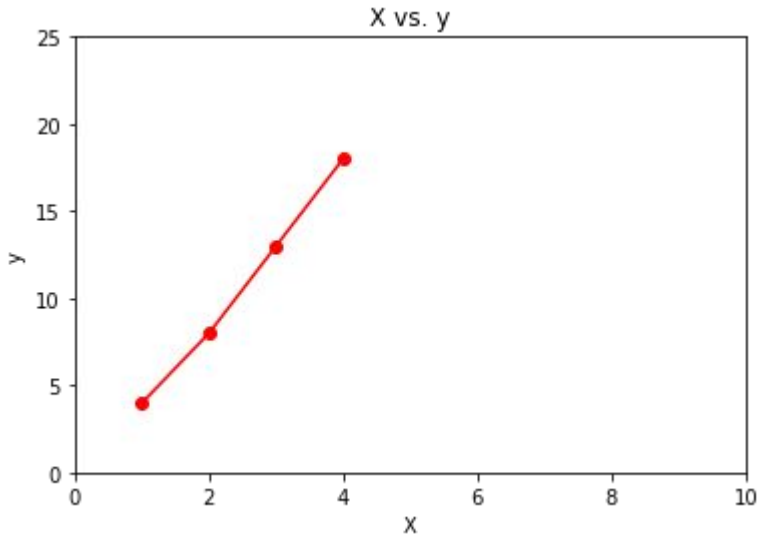
設定抬頭與標籤

```
1.  import matplotlib.pyplot as plt
2.  fig, axe = plt.subplots()
3.  X = [1,2,3,4]
4.  y = [4,8,13,18]
5.  axe.plot(X,y,'o-r')
6.  axe.set_title('X vs. y')
7.  axe.set_xlabel('X')
8.  axe.set_ylabel('y')
9.  fig.show()
```



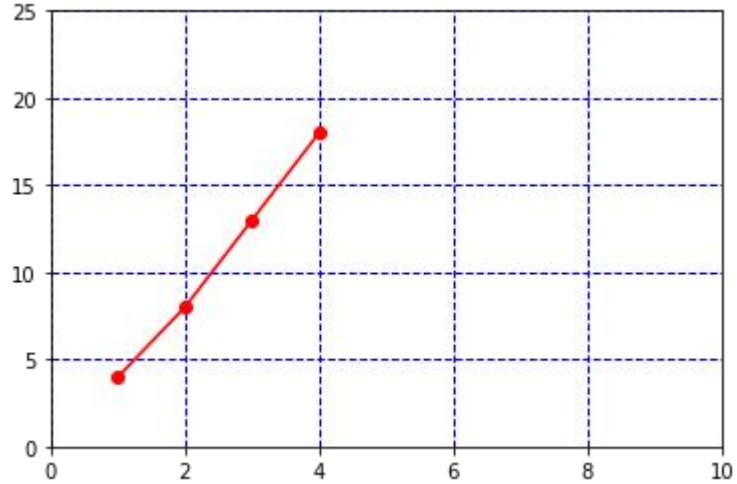
設定範圍區間

```
1.  import matplotlib.pyplot as plt
2.  fig, axe = plt.subplots()
3.  X = [1,2,3,4]
4.  y = [4,8,13,18]
5.  axe.plot(X,y,'o-r')
6.  axe.set_title('X vs. y')
7.  axe.set_xlabel('X')
8.  axe.set_ylabel('y')
9.  axe.set_xlim(0, 10)
10. axe.set_ylim(0, 25)
11. fig.show()
```



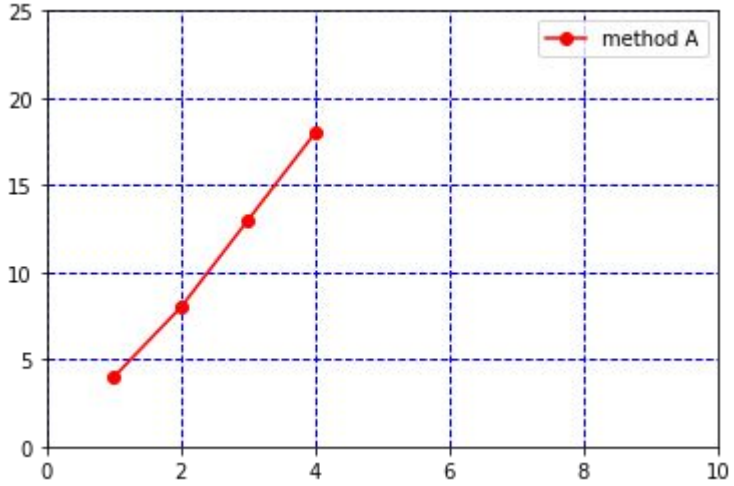
設定格線

```
1.  import matplotlib.pyplot as plt
2.  fig, axe = plt.subplots()
3.  X = [1,2,3,4]
4.  y = [4,8,13,18]
5.  axe.plot(X,y,'o-r')
6.  axe.set_xlim(0, 10)
7.  axe.set_ylim(0, 25)
8.  axe.grid(color='b',linestyle='--',linewidth=1)
9.  fig.show()
```



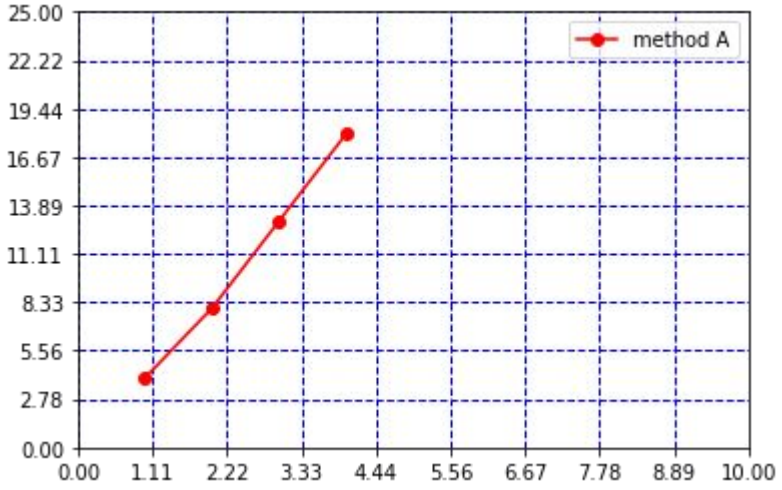
設定圖例

```
1.  import matplotlib.pyplot as plt
2.  fig, axe = plt.subplots()
3.  X = [1,2,3,4]
4.  y = [4,8,13,18]
5.  axe.plot(X,y,'o-r',label='Method A')
6.  axe.set_xlim(0, 10)
7.  axe.set_ylim(0, 25)
8.  axe.grid(color='b',linestyle='--',linewidth=1)
9.  axe.legend()
10. fig.show()
```



設定刻度

```
1.  import matplotlib.pyplot as plt
2.  fig, axe = plt.subplots()
3.  X = [1,2,3,4]
4.  y = [4,8,13,18]
5.  axe.plot(X,y,'o-r',label='Method A')
6.  axe.set_xlim(0, 10)
7.  axe.set_ylim(0, 25)
8.  axe.grid(color='b',linestyle='--',linewidth=1)
9.  axe.set_xticks(np.linspace(0,10,10))
10. axe.set_yticks(np.linspace(0,25,10))
11. axe.legend()
12. fig.show()
```



Q & A

Computer History Museum, Mt. View, CA