assignment06

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1 This is assignment06

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4 Link:https://github.com/pcyyyy/assignment06.git

5 Import packages:

```
In [1]: import numpy as np
        import matplotlib.pyplot as plt
```

6 Give data

```
In [2]: num = 201
        std = 20
        a = 2
        b = 10

        n = np.random.rand(num)
        nn = n - np.mean(n)
        x = np.linspace(-100,100,num)
        y1 = a * x + nn * std + b
        y2 = a * x + b
```

7 Get the sum of x,y1,y2

```
In [7]: Sx = sum(x)
        Sy1 = sum(y1)
        Sxy1 = sum(x*y1)
        Sy2 = sum(y2)
        Sxy2 = sum(x*y2)
        Sxx = sum(x**2)
```

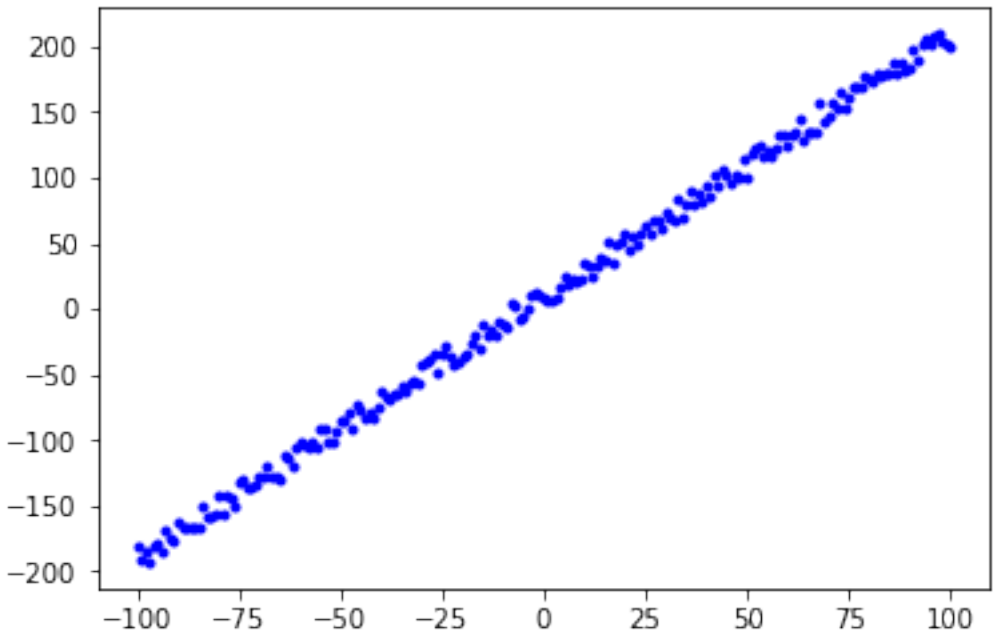
8 Compute the parameters of least square for y1

```
In [10]: A1 = (Sxy1-Sx*Sy1/num)/(Sxx-Sx**2/num)
         A2 = Sy1/num-A1*Sx/num
         print('The value of A1 is %f, A2 is %f'%(A1,A2))
```

```
The value of A1 is 2.002798, A2 is 10.000000
```

9 Plot the noisy data (x,y1)

```
In [13]: plt.plot(x, y1, 'b.')
         plt.show()
```



10 Compute the parameters of least square for y2

```
In [14]: B1 = (Sxy2-Sx*Sy2/num)/(Sxx-Sx**2/num)
         B2 = Sy2/num-A1*Sx/num
         print('The value of A1 is %f, A2 is %f'%(B1,B2))
```

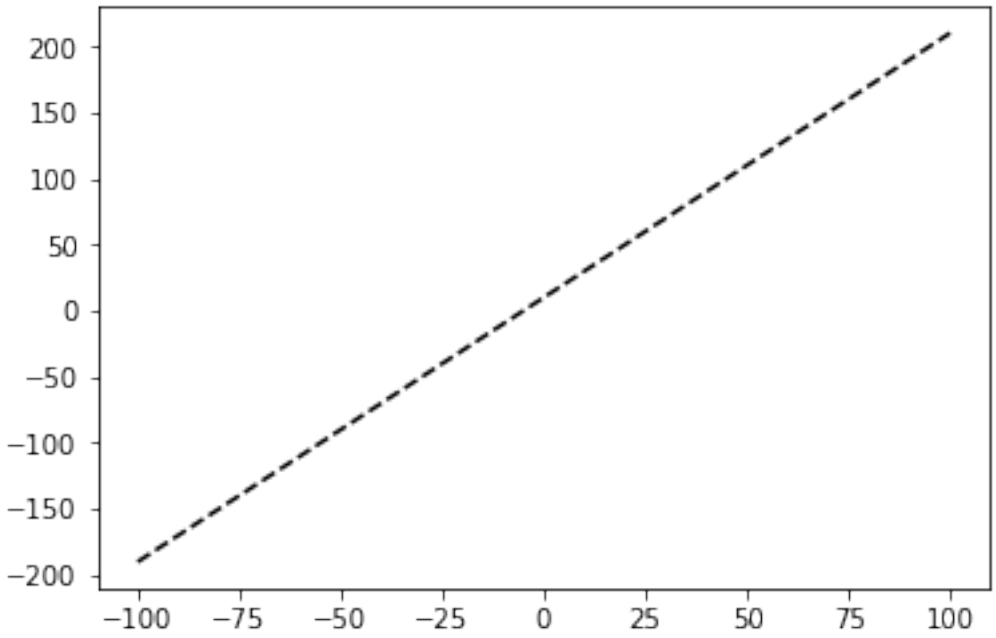
```
The value of A1 is 2.000000, A2 is 10.000000
```

11 The least square function

```
In [15]: fx = B2+B1*x
```

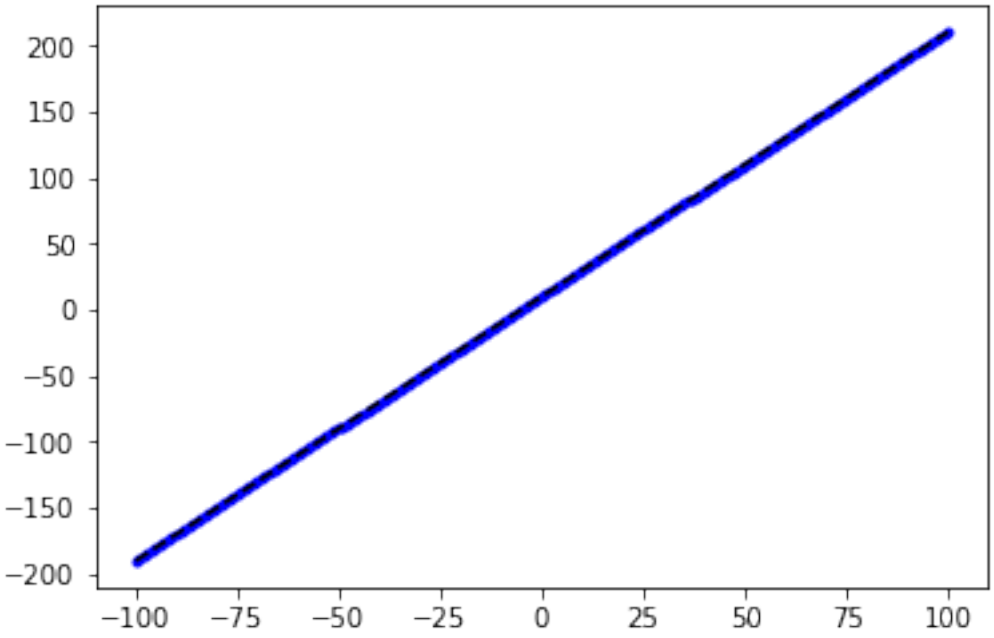
12 Plot the clean data (x,y2)

```
In [16]: plt.plot( x, y2, 'k--')
         plt.show()
```



13 Plot the line that ts the noisy data by the least square error

```
In [17]: plt.plot(x, y2, 'b.',x,fx,'k--')
         plt.show()
```


200
150
100
50
0
−50
−100
−150
−200
−100
−75
−50
−25
0
25
50
75
100