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Code

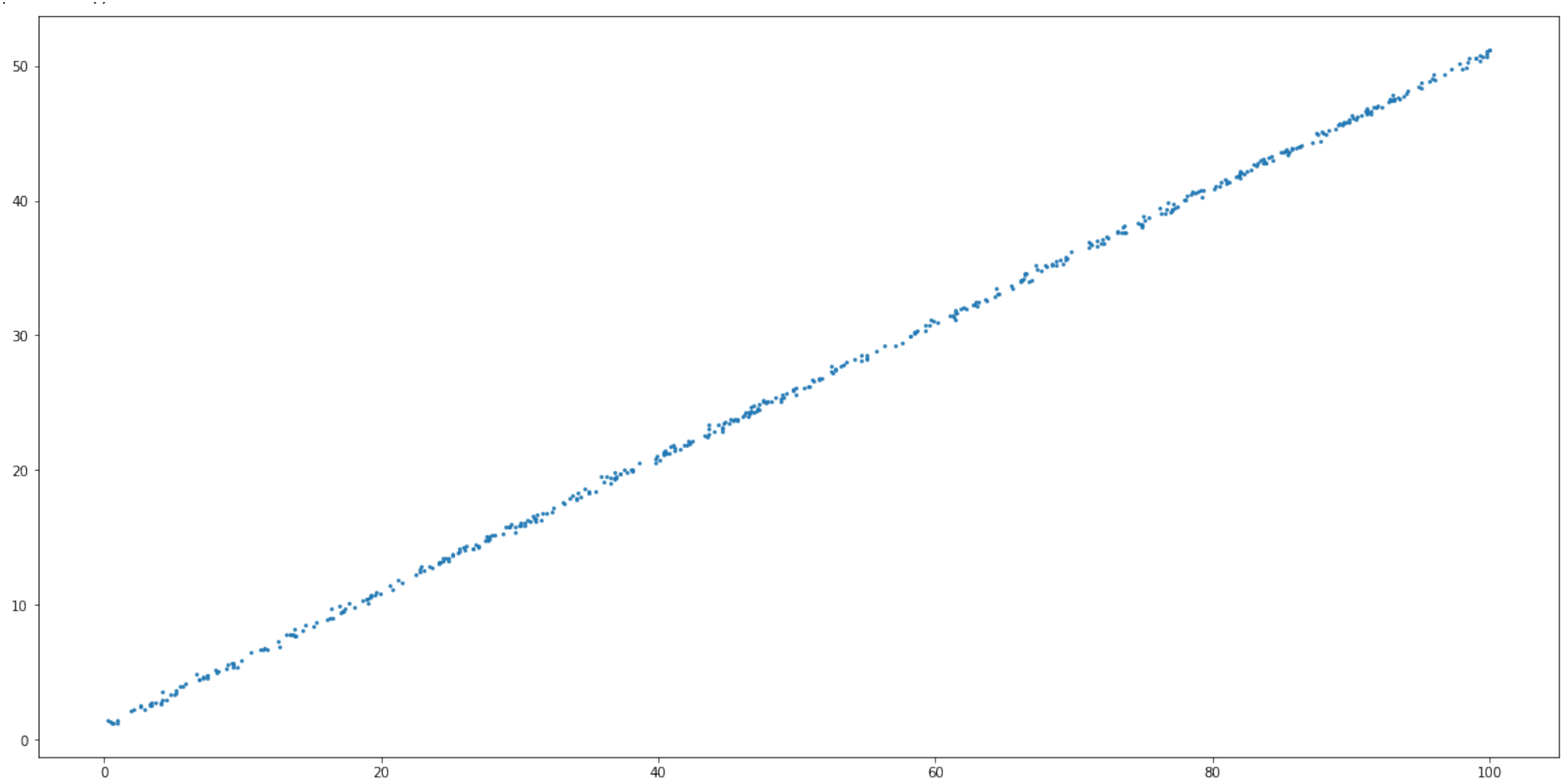
CellToolbar

In [16]:

```
import scipy.stats as sps

import numpy as np
```

```
import matplotlib.pyplot as plt

%matplotlib inline
```
In [12]:

```
bounds = (0, 100)

size_of_sample = 500

X = sps.uniform.rvs(bounds[0], bounds[1], size_of_sample)

noise = sps.norm.rvs(0, 0.2, size_of_sample)

Y = 0.5 * X + noise + 1


plt.figure(figsize=(20, 10))

plt.scatter(X, Y, s=3)

plt.show()
```



In [22]:

```
from scipy.optimize import minimize
```

In [28]:

```
def model(k):
    return k[0] * X + k[1]


def fun(k):
```

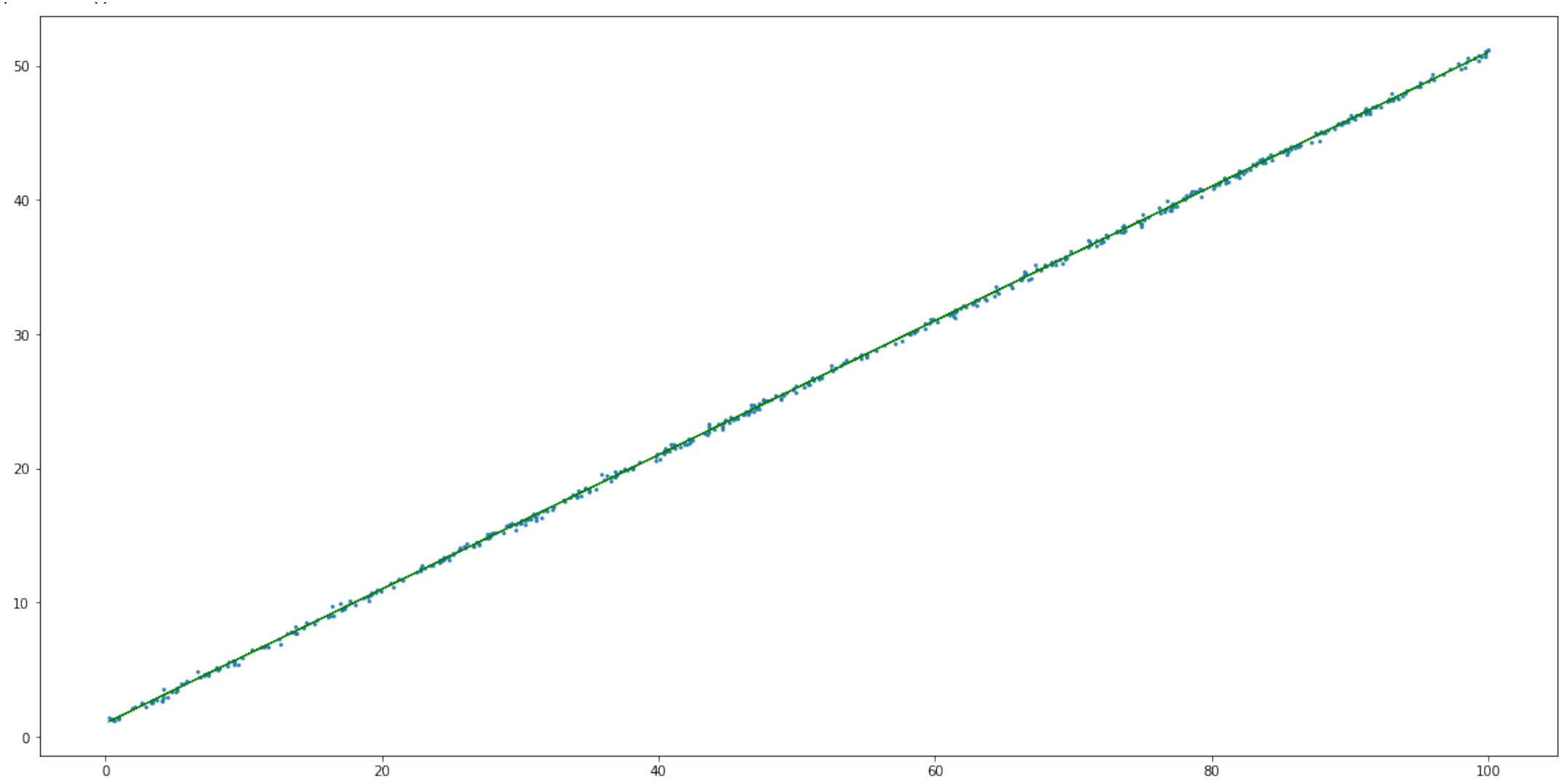
```
    return np.sum((model(k) - Y)**2)



res = minimize(fun, [0, 1.5])
```

In [37]:

```
print "MSE has a result as k = %f, b = %f and a value of minimised func as : %f" % (res.x[0], res.x[1], fun(res.x))
MSE has a result as k = 0.500146, b = 0.994311 and a value of minimised func as : 18.800026
```

In [35]:

```
plt.figure(figsize=(20, 10))

plt.scatter(X, Y, s=3)

plt.plot(X, model(res.x),c='g',linewidth=0.7)

plt.show()
```

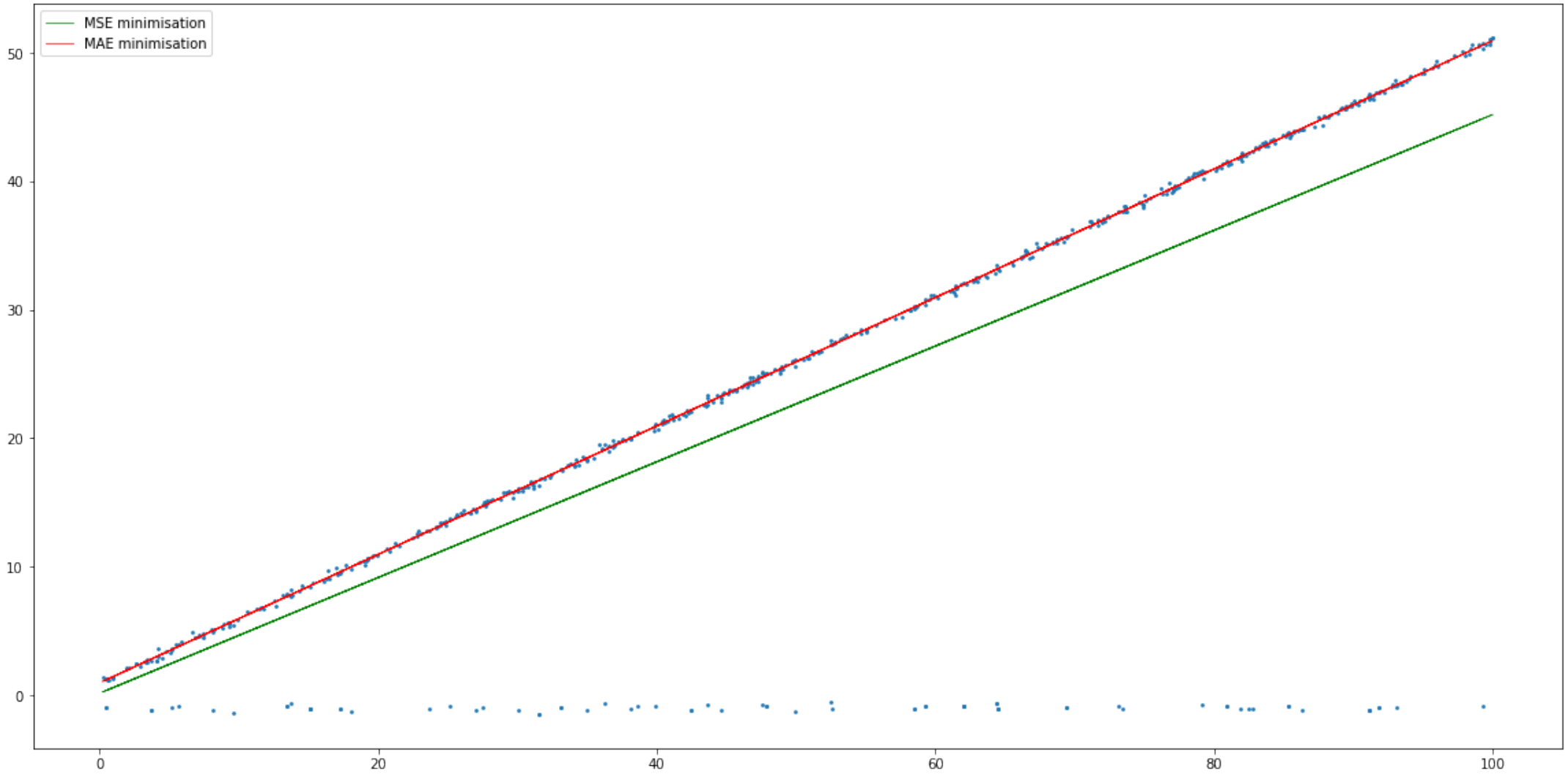


In [57]:

```
blowout_size = 75
blowout_id = np.array(map(int,sps.uniform.rvs(bounds[0],bounds[1], blowout_size)))
X_blowout = X[blowout_id]
noise_blowout = noise[blowout_id]
Y_blowout = -1 + noise_blowout
```

```
X_new = np.array(list(X) + list(X_blowout))
Y_new = np.array(list(Y) + list(Y_blowout))

def model_new(k):
    return k[0] * X_new + k[1]

def MSE_fun_new(k):
    return np.sum((model_new(k) - Y_new)**2)

def MAE_fun_new(k):
    return np.sum(np.abs(model_new(k) - Y_new))



res = minimize(MSE_fun_new, [0, 1.5])
res_MAE = minimize(MAE_fun_new, [0, 1.5])

print "MSE has a result as k = %f, b = %f and a value of minimised func as : %f\n" % (res.x[0], res.x[1], MSE_fun_new(res.x))
print "MAE has a result as k = %f, b = %f and a value of minimised func as : %f" % (res_MAE.x[0], res_MAE.x[1], MAE_fun_new(res.x))

plt.figure(figsize=(20, 10))
plt.scatter(X_new, Y_new, s=3)
plt.plot(X, model(res.x),c='g',linewidth=0.7, label="MSE minimisation")
plt.plot(X, model(res_MAE.x),c='r',linewidth=0.7,label="MAE minimisation")
plt.legend()
plt.show()
```

```
MSE has a result as k = 0.450598, b = 0.145170 and a value of minimised func as : 57719.779273
MAE has a result as k = 0.500168, b = 0.953347 and a value of minimised func as : 3413.043402
```



Функция ошибки в виде суммы абсолютной ошибки более устойчива к выбросам

Функция ошибки в виде суммы абсолютной ошибки более устойчива к выбросам