In [21]:

```
import matplotlib.pyplot as plt
import numpy as np
import scipy.stats as sps
%matplotlib inline
```

In [22]:

```
X = np.loadtxt('data.txt')
```

Сведем задачу к линейной:

$$Y_i = X_i - X_{i-1} \quad ¶$$

$$Y_0 = X_0 = \beta_1 + \varepsilon_0$$

$$Y_i = \beta_2 + \varepsilon_i$$

In [23]:

```
Y = []
Y.append(X[0])

for i in range(1, len(X), 1):
    Y.append(X[i] - X[i - 1])
```

Найдем оценку для $(\beta_1, \beta_2) = \left(Y_0, \frac{\sum_{i=1}^{n} Y_i}{n-1} \right)^T$

In [24]:

```
beta_1 = Y[0]
beta_2 = (sum(Y) - Y[0])*1./(len(Y)-1)
print(beta_1, " ", beta_2)
```

```
625.377585   8.87619493333
```

Несмещенная оценка для $\sigma^2 = \frac{1}{n-1} \left(\sum_{j=1}^{n} \left(Y_j + \frac{\sum_{i=1}^{n} Y_i}{n-1} \right) \right)$

In [25]:

```
for i in range(len(Y)):
    Y[i] = Y[i] + beta_2
sigma2 = (sum(Y) - Y[0])*1./(len(Y)-1)
print(sigma2)
```

```
17.7523898667
```

Выразим оценку для дисперсии времени $\sigma_t^2 = \frac{\sigma^2}{\beta_2^2}$

In [26]:

```
sigma2_t = sigma2 *1. / beta_2 / beta_2
print(sigma2_t)
```

```
0.225321775268
```

In [27]:

```
file = open('497 Нургалиева Эгделия.txt', 'w')
s = str(beta_1)+" "+str(beta_2)+" "+str(sigma2)+" "+str(sigma2_t)
file.write(s)
```

Out[27]:

```
53
```

In [ ]:

```

```