**Maximum likelihood method**

**Estimators**

x1,x2,…,xn sample of distribution , where *f* is probability density function

Data fitting - I have model, data, and I am looking for parameters

Estimator – estimate of the value of parameter, it is a random variable

Properties of estimators

1. Consistence

That is, that it is a correct estimate (by increasing the number of measurements, it approaches the real value )

1. Bias

If *b* = 0 it is an unbiased estimator, otherwise it is a biased estimator.

1. Mean Square Error

Effectivelly, it is a statistical and systematical error

Ideal estimator is consistent, unbiased and efficient (has lowest possible variance)

**Maximum likelihood method for calculations of estimators**

xi are considered independent

Then the probability that we measure x1,x2,…,xn is:

We také such that this probability is maximal:

Example: exponential distribution, *t*1,…,*t*n

Solution:

**Variance of estimators**

Example: Exponential distribution

So Note:

Rao-Cramerova nerovnost

* Lower limit for estimator variance: