1. Let $q_1, \cdots, q_n$ be n values of $q = f(x)$ for n direct measurements of $x_1, \cdots, x_n$, where f is known function. In this case q_i's become *indirect* measurements of q.

   It can be shown that the best value $\bar{q}$ of q is $\bar{q} = f(\bar{x})$ where $\bar{x}$ and $\bar{y}$ are the arithmetic means of x_i's and q_i's respectively.

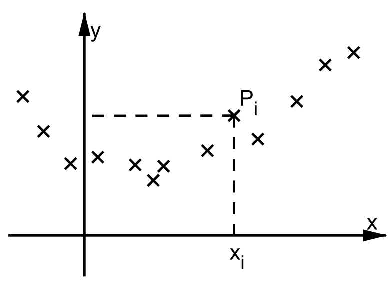
   Example 0.1. The length l of a simple pendulum is measured as 24,8; 25,1; 25,0; 24,8; 25,0; 25,1; 24,7; 25,1 cm. Then
   a) find the best length $\bar{l}$
   b) find the best period.

   Solution.

   a) $\bar{l} = (\sum l_i)/8 = 24,95$ cm,
   b) $T = \pi\sqrt{l/g} = \pi\sqrt{24,95/g} = 4.99\pi/\sqrt{g}$.

2. Let y be related to x by an unknown function f, and let $y_1, \cdots, y_n$ be the measured values of y corresponding to a set of selected values $x_1, \cdots, x_n$ of x.

   When one plots the points $P_i(x_i, y_i)$ on a rectangular coordinate system 0xy, we obtain a distribution of y against x.

   Now the problem is to determine the best function giving this distribution.

   The solution of the problem involves the following steps:
   i. from the distribution guess the type of the function as linear,quadratic, exponential, $\cdots$,
   ii. write the general form of the function,
   iii. by the use of the MLS, determine the unknown parameters.