FIT1 : Sorawich Maichum – sm9cq

Exercise 1 : fit1a.C

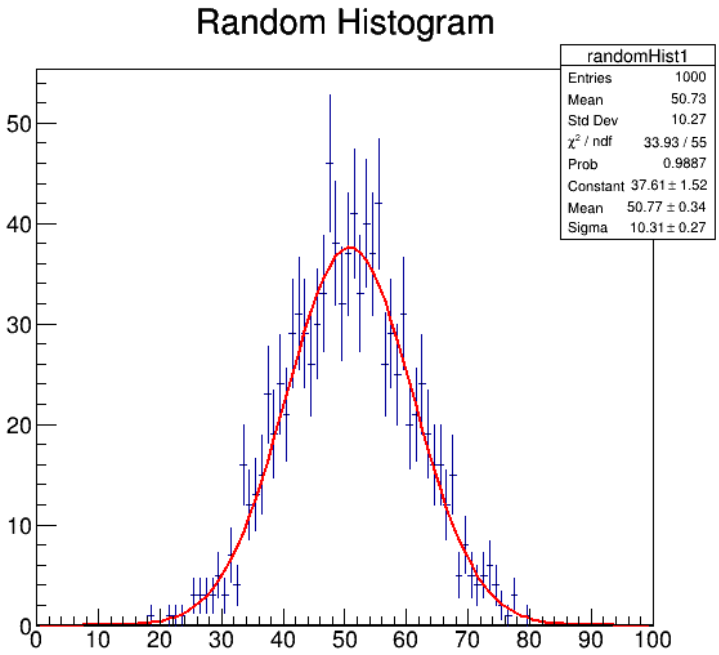

Figure 1 : Histogram of fit1a.C with Gaus with mean = 50 and sigma = 10

Then, use this distribution to get a fitting function and use the fitting function to regenerate the pseudo data 1000 times for each 1000 observations.

Afterward, use the pseudo data to make a plot of reduced Chi2 and parameter(mean,sigma,probability) uncertainties checking in the Figure 2.

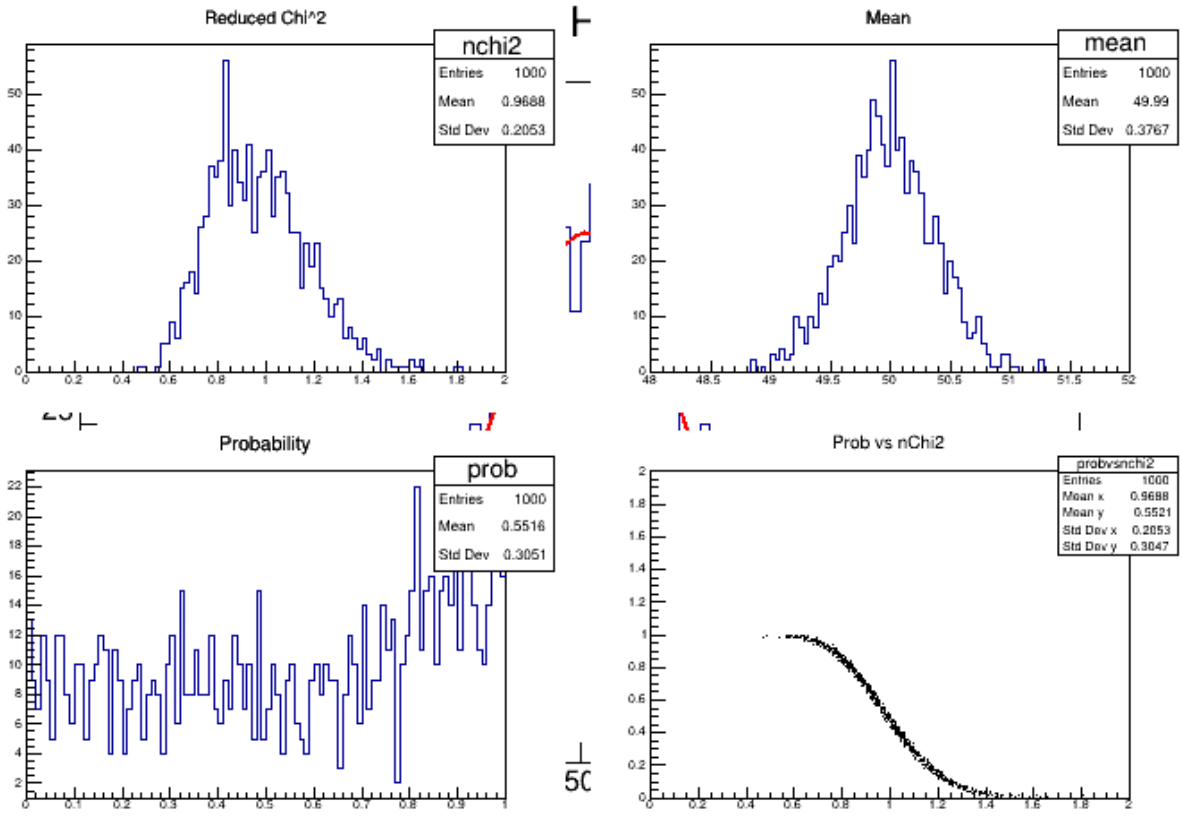

Figure 2 : The uncertainty of the fitting parameter

From fig1, the 1 sigma width of the distribution is about 10.3 which can be compared with the uncertainty of the parameters which are around 0.2-0.3.

Apparently, the 1 sigma width of the distribution is around 30-50 times of the uncertainty of the parameters.

It is reasonable. I think if the uncertainty of parameters is larger or as equal as the 1 sigma width of the distribution is impossible. It would be other distribution such as flat distribution, etc.

The third plot of this figure is a value of the Chi2 probability and the fourth is the scatter of reduced Chi2 probability vs the reduced Chi2.

Exercise2: Lowering the statistics and using maximum likelihood fits

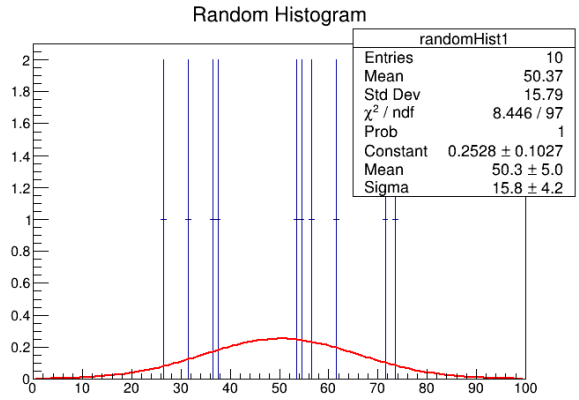

Figure 3 : The case at very low statistics(small data)

In this case, we will use the maximum likelihood to approximate the probability distribution of sample to be a gaussian distribution and we will use this method to a homework.

Homework

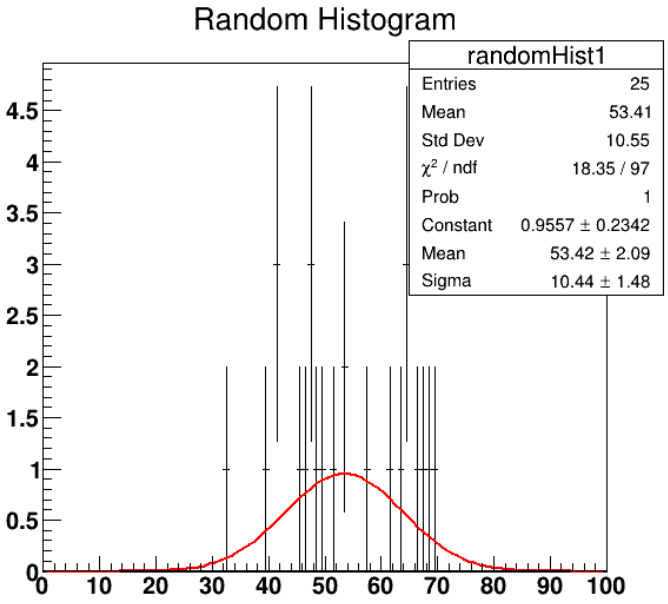

Figure 4 : a given distribution for a homework

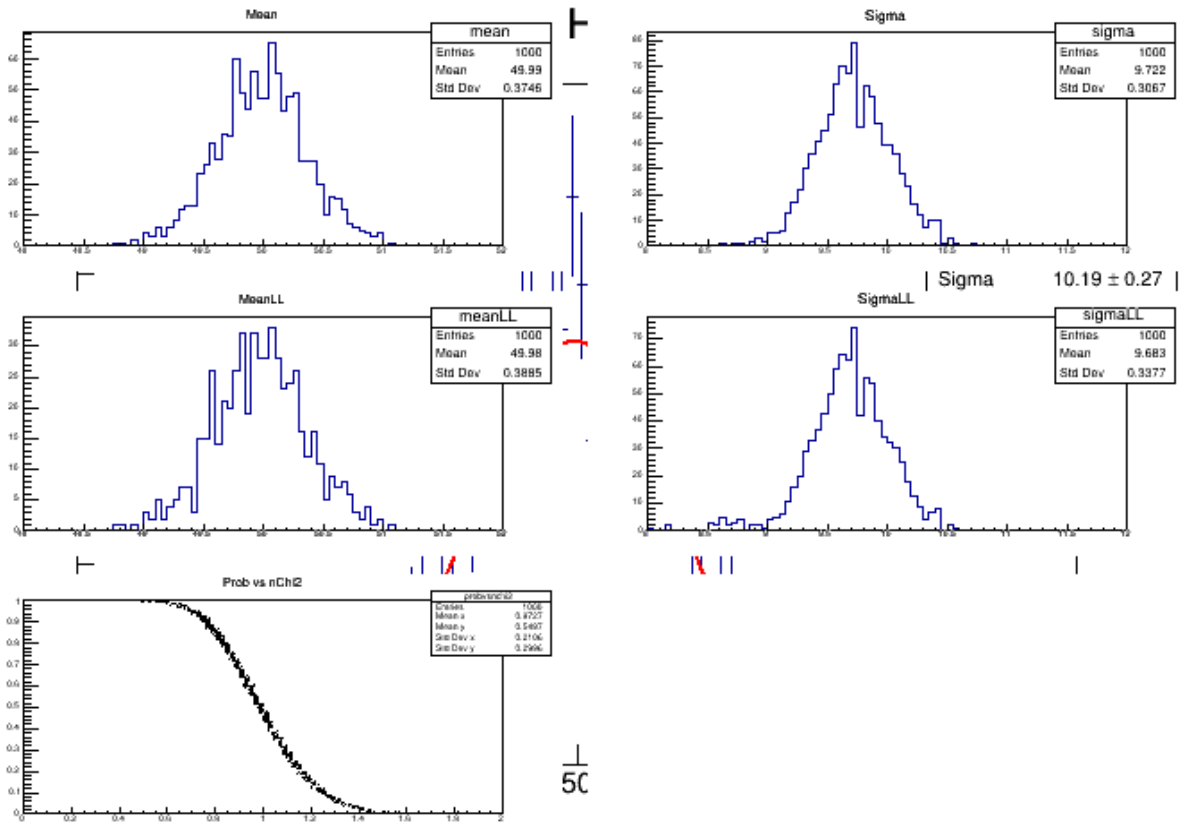

Figure 5: the distribution of the fitted mean and sigma for the 2 methods above.

By seeing this figure, they show that there is no significant difference between 2 method to fitting the data.

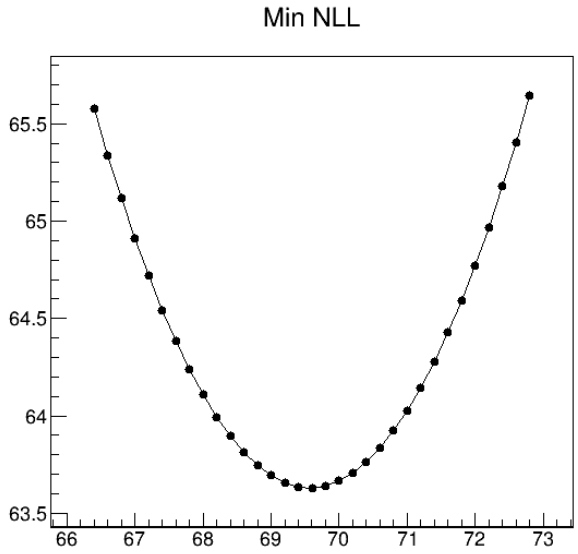

Figure 6: the vary of mean for a negative loglikelihood method.

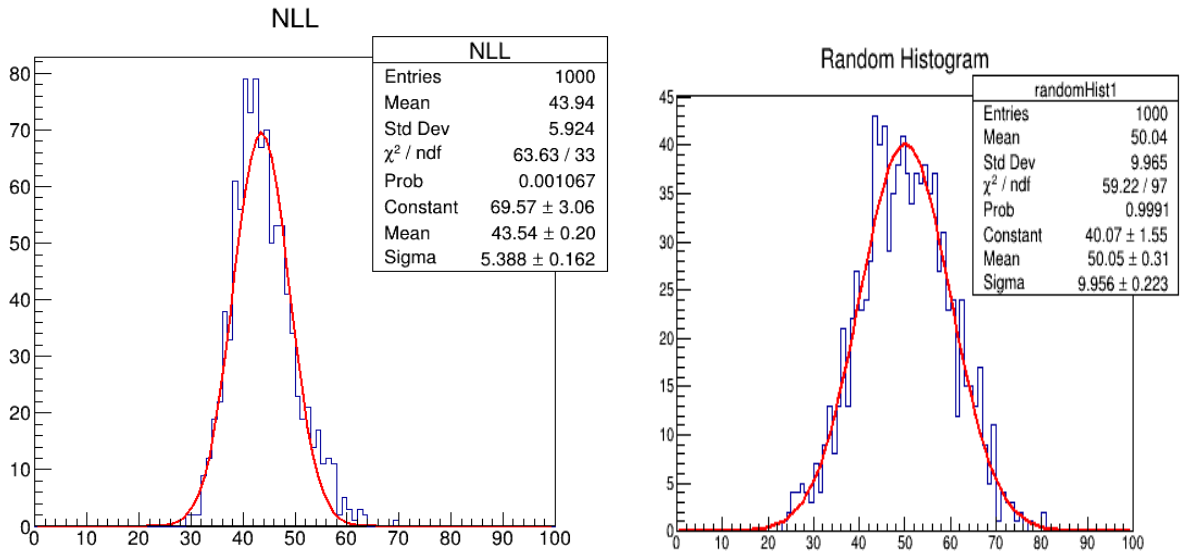

Figure 7: the distribution of the NLL method (Left) to compared with the Chi2.

As a result, the results from both types of fits are quite the same.