README

In this lab we learned how to use the given data to find an underlying relationship between them. The method of linear least square parameter fitting was used to solve linear parameter fitting problem. As to the non-linear problem, the nonlinear regression with the Gauss Newton method was used. The model which fit the data was plotted together with sample point as a comparison and the student t test was performed to test the model.

This folder includes:
README.pdf: which is the documentation of the lab
report.pdf: which is the writing part of the lab
regression.cpp: which is the code doing the linear\non linear regression
matrix.h: which is the file handeling the matrix calculation
makefile: which helps compile the code

To compile and run the code the linux environment with g++ compiler is needed, also the lapack needs to be installed.
Type make in the terminal to compile the code, the execution file regression.x will be generated. To run the code, type ./regression.x

Output:

question1:
a0 and a1 was calculated as follow:
16.4042389
2.0087768

the T value is 83.437 with degrees of freedom 98

question2:
Guess 1: initial values of a0-a3 are all 1: when sse value reach 34320.3 the iteration stop, which gives the value of a0-a3 to be:
10.7314599
2.2448251
-3.6905773
0.2384493

Guess 2: initial values of a0-a3 are all 1000: when sse value reach 34320.3 the iteration stop, which gives the value of a0-a3 to be:
10.7314599
2.2448251
-3.6905773
0.2384493

Test case use user defined data set

Test : the x is independent on y for the linear model

question1:
a0 and a1 was calculated as follow:
0.3245722
-0.0026521