

```

//Linear Fit
#include<iostream>
#include<iomanip>
#include<cmath>
using namespace std;
int main()
{
    int i,j,k,n;
    cout<<"\nEnter the no. of data pairs to be entered:\n";           //To find the size
of arrays
    cin>>n;
    double x[n],y[n],a,b;
    cout<<"\nEnter the x-axis values:\n";                             //Input x-values
    for (i=0;i<n;i++)
        cin>>x[i];
    cout<<"\nEnter the y-axis values:\n";                             //Input y-values
    for (i=0;i<n;i++)
        cin>>y[i];
    double xsum=0,x2sum=0,ysum=0,xysum=0;                             //variables for sums/sigma of
xi,yi,xi^2,xiyi etc
    for (i=0;i<n;i++)
    {
        xsum=xsum+x[i];                                     //calculate sigma(xi)
        ysum=ysum+y[i];                                     //calculate sigma(yi)
        x2sum=x2sum+pow(x[i],2);                             //calculate sigma(x^2i)
        xysum=xysum+x[i]*y[i];                             //calculate sigma(xi*yi)
    }
    a=(n*xysum-xsum*ysum)/(n*x2sum-xsum*xsum);               //calculate slope
    b=(x2sum*ysum-xsum*xysum)/(x2sum*n-xsum*xsum);          //calculate intercept
    double y_fit[n];                                         //an array to store the new fitted values
of y
    for (i=0;i<n;i++)
        y_fit[i]=a*x[i]+b;                                   //to calculate y(fitted) at given x
points
    cout<<"S.no"<<setw(5)<<"x"<<setw(19)<<"y(observed)"<<setw(19)<<"y(fitted)"<<endl;
    cout<<"-----\n";
    for (i=0;i<n;i++)
        cout<<i+1<<". "<<setw(8)<<x[i]<<setw(15)<<y[i]<<setw(18)<<y_fit[i]<<endl; //print
a table of x,y(obs.) and y(fit.)
    cout<<"\nThe linear fit line is of the form:\n\n"<<a<<"x + "<<b<<endl;
//print the best fit line
    return 0;
}

```

Enter the no. of data pairs to be entered:

4

Enter the x-axis values:

50

70

100

120

Enter the y-axis values:

12

15

21

25

S.no	x	y(observed)	y(fitted)
1.	50	12	11.6724
2.	70	15	15.431
3.	100	21	21.069
4.	120	25	24.8276

The linear fit line is of the form:

$$y = 0.187931x + 2.27586$$

Enter the no. of data pairs to be entered:

5

Enter the x-axis values:

20.5

32.7

51.0

73.2

95.7

Enter the y-axis values:

765

826

873

942

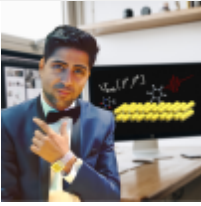
1032

S.no	x	y(observed)	y(fitted)
1.	20.5	765	771.767
2.	32.7	826	813.184
3.	51	873	875.311
4.	73.2	942	950.677
5.	95.7	1032	1027.06

The linear fit line is of the form:

$$y = 3.39487x + 702.172$$

Explanation of the code:



Manas Sharma

I'm a physicist specializing in computational material science with a PhD in Physics from Friedrich-Schiller University Jena, Germany. I write efficient codes for simulating light-matter interactions at atomic scales. I like to develop Physics, DFT, and Machine Learning related apps and software from time to time. Can code in most of the popular languages. I like to share my knowledge in Physics and applications using this Blog and a YouTube channel.

manas.bragitoff.com/



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