

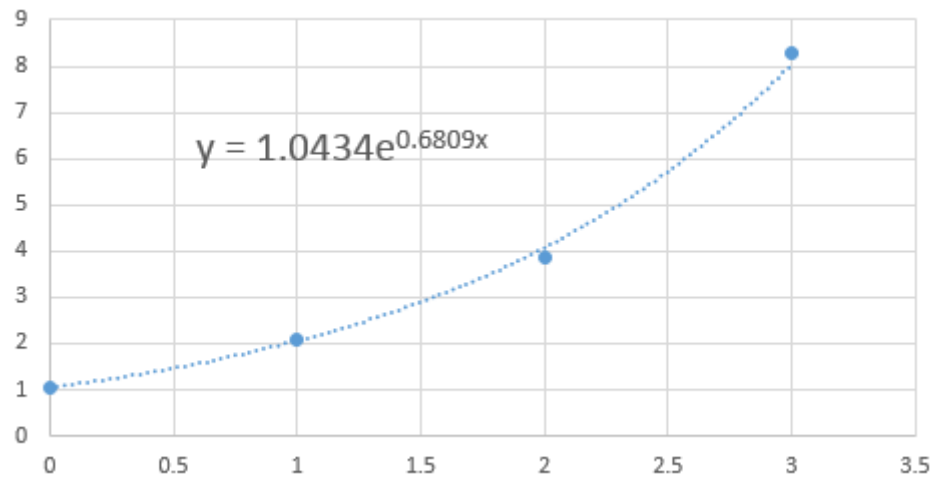
For a better written but C version of the program go here:

<https://www.bragitoff.com/2018/06/exponential-fitting-c-program/>

```

//Exponential 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],lny[n],a,b,c;
    cout<<"\nEnter the x-axis values:\n";                             //Input x-values(observed)
    for (i=0;i<n;i++)
        cin>>x[i];
    cout<<"\nEnter the y-axis values:\n";                             //Input y-values(observed)
    for (i=0;i<n;i++)
        cin>>y[i];
    for (i=0;i<n;i++)           //Calculate the values of ln(yi)
        lny[i]=log(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+lny[i];         //calculate sigma(yi)
        x2sum=x2sum+pow(x[i],2);  //calculate sigma(x^2i)
        xysum=xysum+x[i]*lny[i]; //calculate sigma(xi*yi)
    }
    a=(n*xysum-xsum*ysum)/(n*x2sum-xsum*xsum);                       //calculate slope(or the the
power of exp)
    b=(x2sum*ysum-xsum*xysum)/(x2sum*n-xsum*xsum);                   //calculate intercept
    c=pow(2.71828,b);           //since b=ln(c)
    double y_fit[n];             //an array to store the new fitted values
of y
    for (i=0;i<n;i++)
        y_fit[i]=c*pow(2.71828,a*x[i]);                             //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 corresponding line is of the form:\n\nlny = "<<a<<"x + ln"<<b<<endl;
    cout<<"\nThe exponential fit is given by:\ny = "<<c<<"e^"<<a<<"x\n";
    return 0;
}

```



Enter the no. of data pairs to be entered:

4

Enter the x-axis values:

0 1 2 3

Enter the y-axis values:

1.05 2.10 3.85 8.30

S.no	x	y(observed)	y(fitted)
1.	0	1.05	1.0434
2.	1	2.1	2.0613
3.	2	3.85	4.07223
4.	3	8.3	8.04493

1. 0 1.05 1.0434

2. 1 2.1 2.0613

3. 2 3.85 4.07223

4. 3 8.3 8.04493

The corresponding line is of the form:

$\ln y = 0.680853x + \ln 0.0424843$

The exponential fit is given by:

$y = 1.0434e^{0.680853x}$



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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.



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