I have written a code that will exponentially fit a given set of data-points.(Yfit=c*e^(a*x))

The procedure is based on least square approximation, which, in simple words,works by finding a line that is at a minimum distance possible from all the points.

Let's say you have the x-axis points stored in a matrix, 'x' & the y-axis points stored in a matrix 'y'. Then the following code returns the value of the coefficient, 'c' and 'a' such that the equation of the fitted line is y=c*e^(a*x), and also the fitted points which are basically the points of the y-axis obtained from the equation of the best fit-line.

CODE:

```
//Exponential Fitting
//To exponentially fit a given set of data-points.
//Written By: Manas Sharma(www.bragitoff.com)
funcprot(0);
function [f,a,c]=expofit(x,y)
    n=size(x);
    if n(2)>n(1) then
        n=n(2)
    else
        n=n(1);
    end
    for i=1:n
        Yln(i)=log(y(i));
    end
    xsum=0;
    ysum=0;
    xysum=0;
    x2sum=0;
    for i=1:n
        xsum=x(i)+xsum;
        ysum=Yln(i)+ysum;
        x2sum=x(i)*x(i)+x2sum;
        xysum=x(i)*Yln(i)+xysum;
    end
    a=(n*xysum-xsum*ysum)/(n*x2sum-xsum*xsum);
    b=(x2sum*ysum-xsum*xysum)/(x2sum*n-xsum*xsum);
    c=exp(b);
    for i=1:n
        f(i)=c*exp(a*x(i));
    end
endfunction
```

Sample Demo:

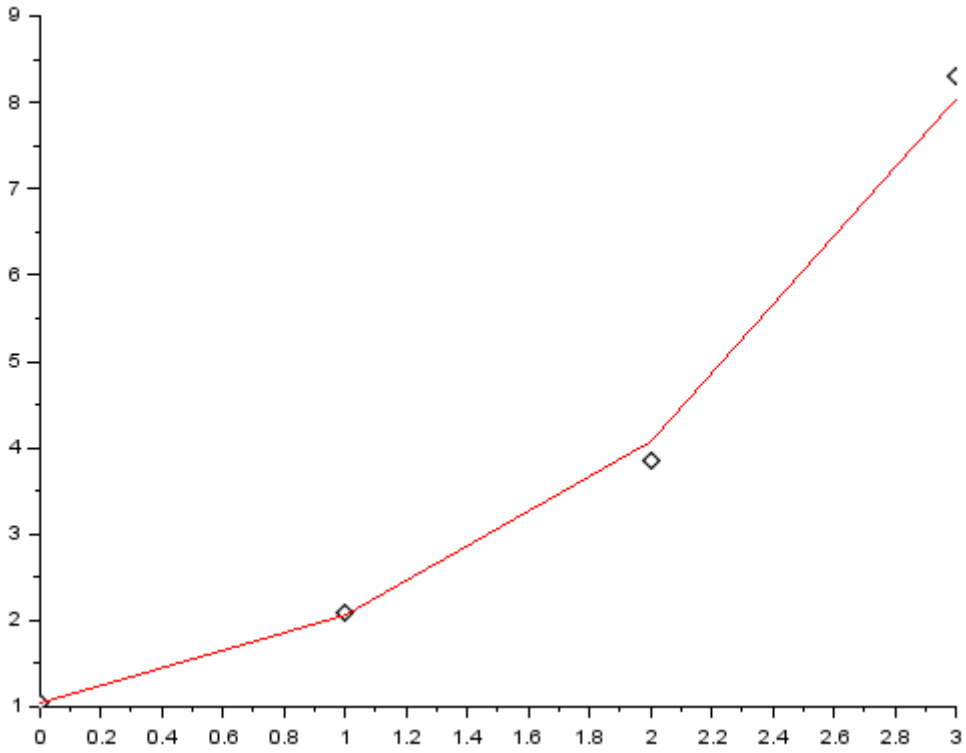
```
x=[0,1,2,3];
y=[1.05,2.1,3.85,8.3];
[yfit,a,c]=expofit(x,y)
```

Output:

```
c  =

    1.0433996
 a  =

    0.6808532
 yfit  =

    1.0433996
    2.0613012
    4.0722295
    8.044944
```

We can now even plot the observed data-points and the fitted points(yfit) and compare the two.

```
plot2d(x,y,-5)
plot2d(x,yfit,5)
```



I have created a module in SCILAB which contains the above macro, and once installed can be used as an in-built function. You can download it from here: https://atoms.scilab.org/toolboxes/curvefit

Leave your questions/suggestion/corrections in the comments section down below and I'll get back to you soon.

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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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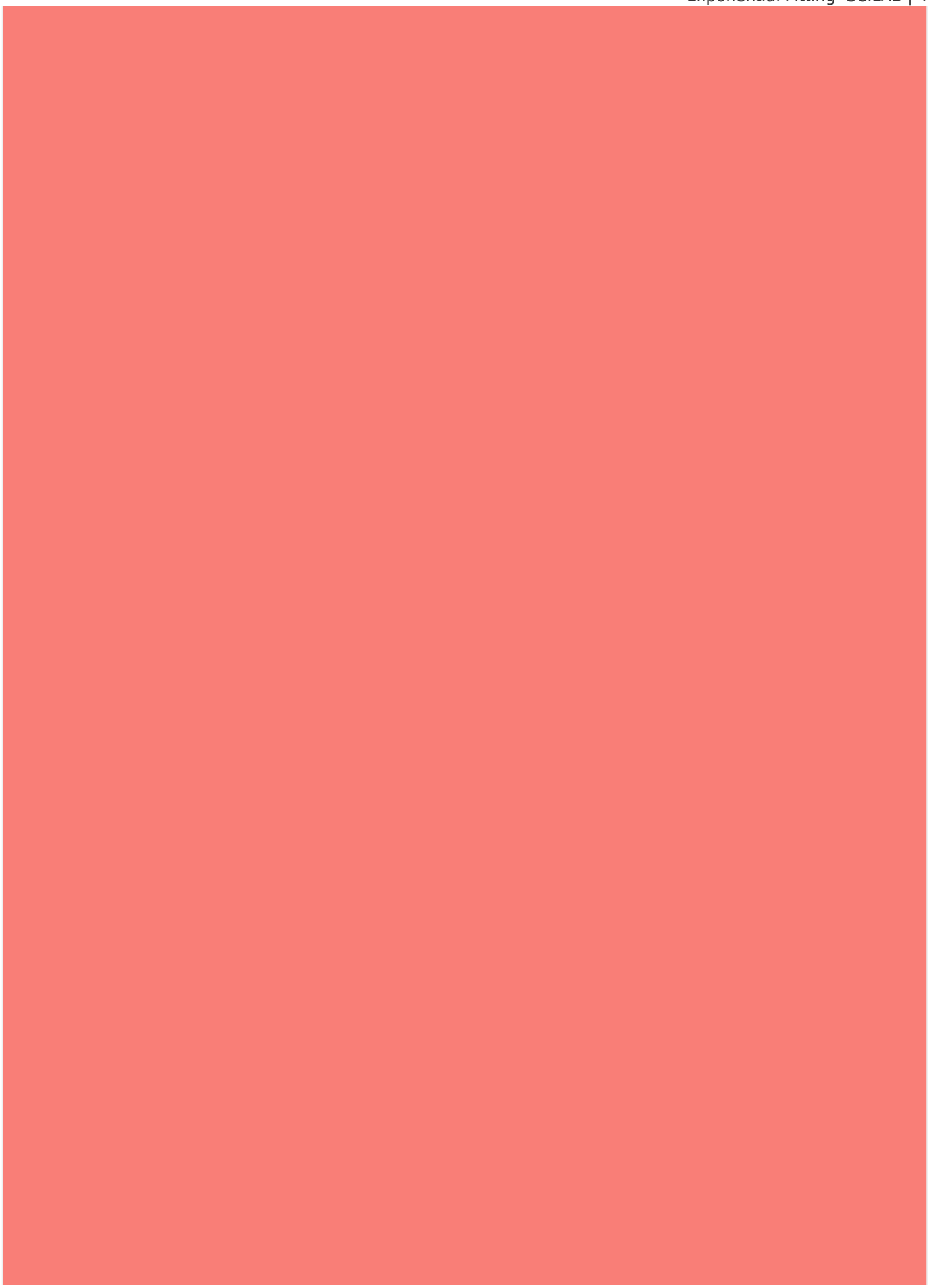

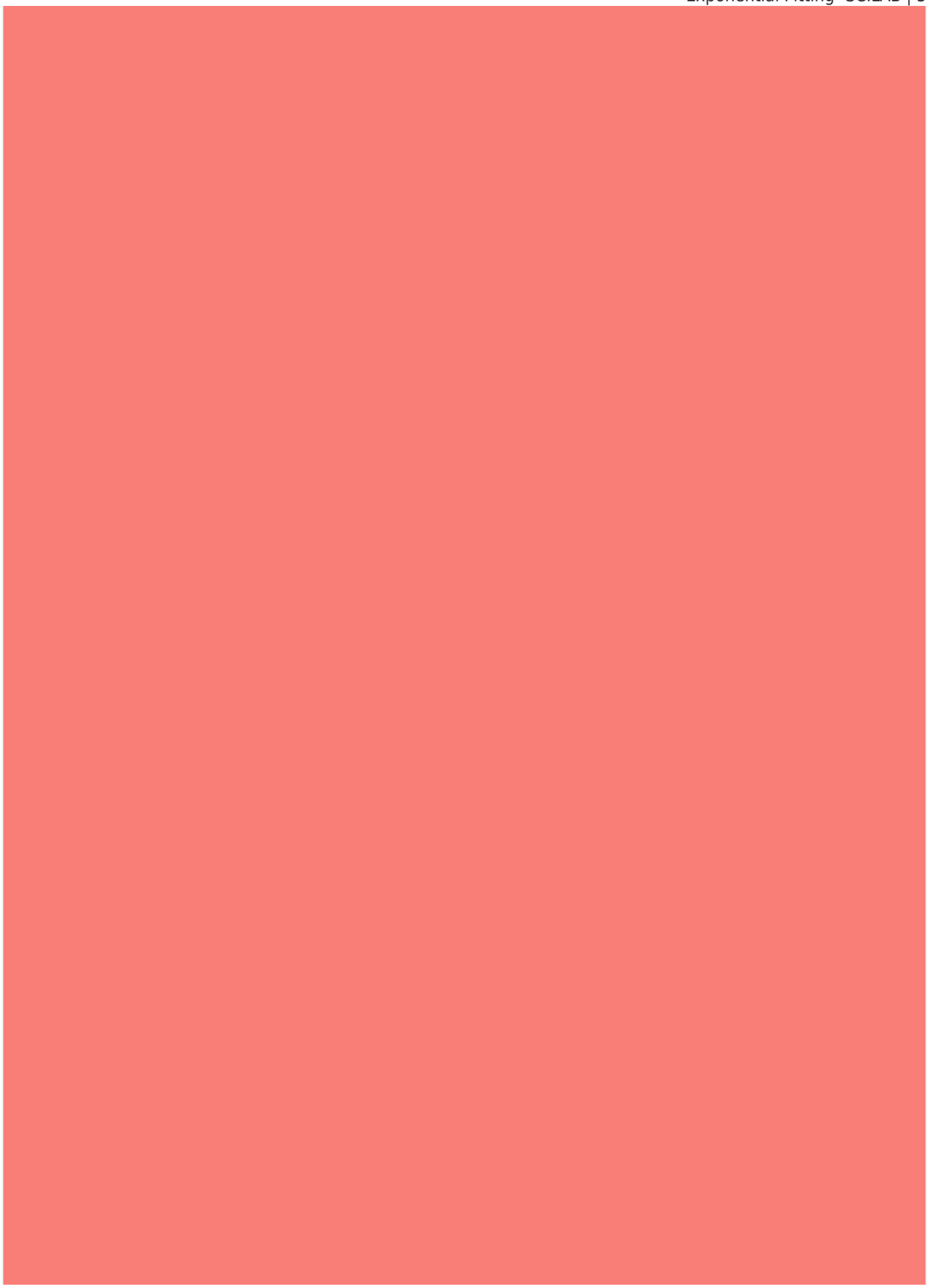

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