I have written a code that will calculate the equation of the best fit-line for a given set of data-points.

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 slope, 'm' and intercept 'c' of the best fit-line, and also the fitted points which are basically the points of the y-axis obtained from the equation of the best fit-line.

CODE:

```
//Linear Fit
//To fit a given set of data-points to a line.
//Written By: Manas Sharma(www.bragitoff.com)
funcprot(0);
function [f,m,c]=linefit(x,y)
    n=size(x);
    if n(2)<n(1) then
        n=n(2)
    else
        n=n(1);
    end
    xsum=0;
    ysum=0;
    xysum=0;
    x2sum=0;
    for i=1:n
        xsum=x(i)+xsum;
        ysum=y(i)+ysum;
        x2sum=x(i)*x(i)+x2sum;
        xysum=x(i)*y(i)+xysum;
    end
    m=(n*xysum-xsum*ysum)/(n*x2sum-xsum*xsum);
    c=(x2sum*ysum-xsum*xysum)/(x2sum*n-xsum*xsum);
    for i=1:n
        f(i)=m*x(i)+c;
    end
endfunction
```

Sample Demo:

```
x=[1,2,3,4,5];
y=[2,4,6,8,10];
[yfit,m,c]=linefit(x,y)
```

Output:
c =

0.
m =

2.
yfit =

2.
4.
6.
8.
10.

In this example the y-axis points were simply twice of the value of x-axis points. Hence the equation of line, we get is $y=mx+c=>y=2x$.

Now let's try something not so straight forward.

Sample Demo:

```
x=[1,2,3,4,5];
y=[0.5,2.5,3.3,4.1,5.5];
[yfit,m,c]=linefit(x,y)
```

Output:

c =

- 0.3
  m =

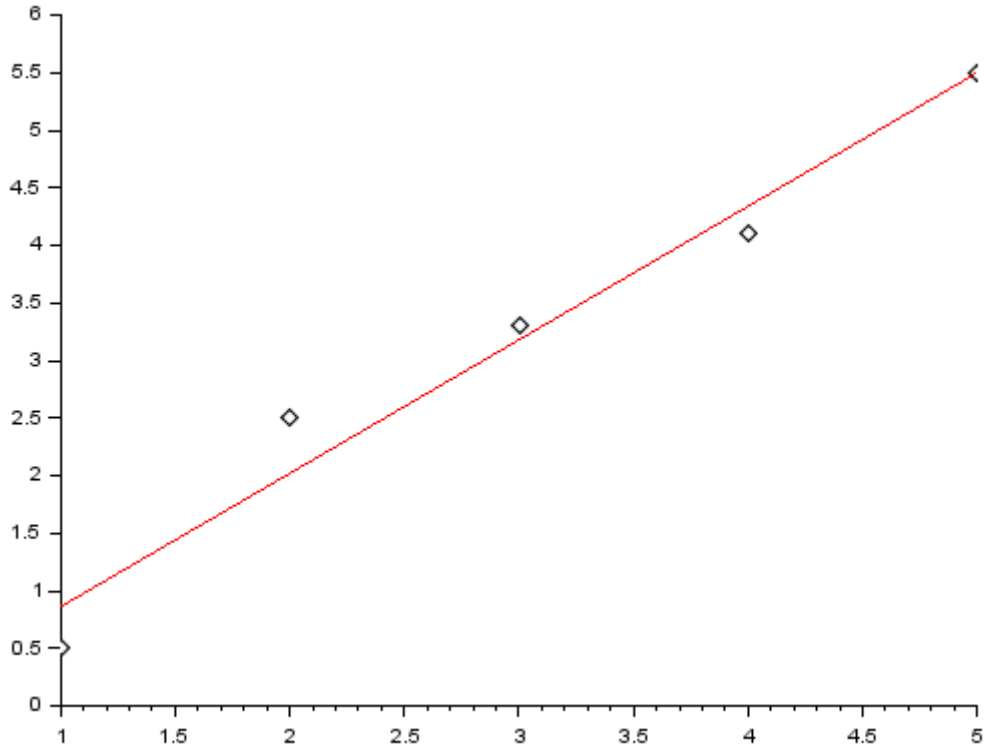
1.16
yfit =

0.86
2.02
3.18
4.34
5.5

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

```
plot2d(x,y,-5)  //dotted points for the original/observed data-points
plot2d(x,yfit,5) //red line for the fitted points
```

Output:



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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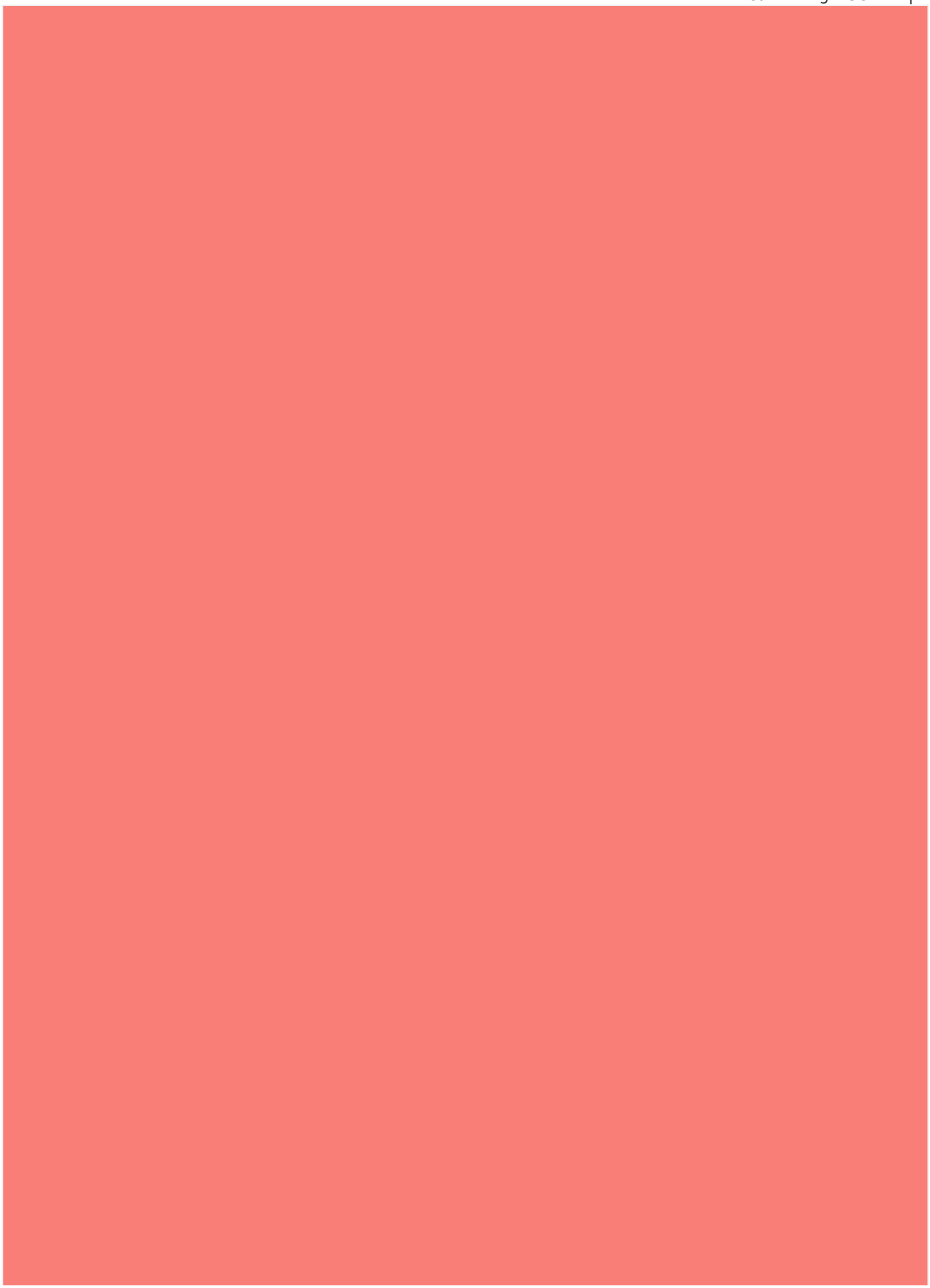

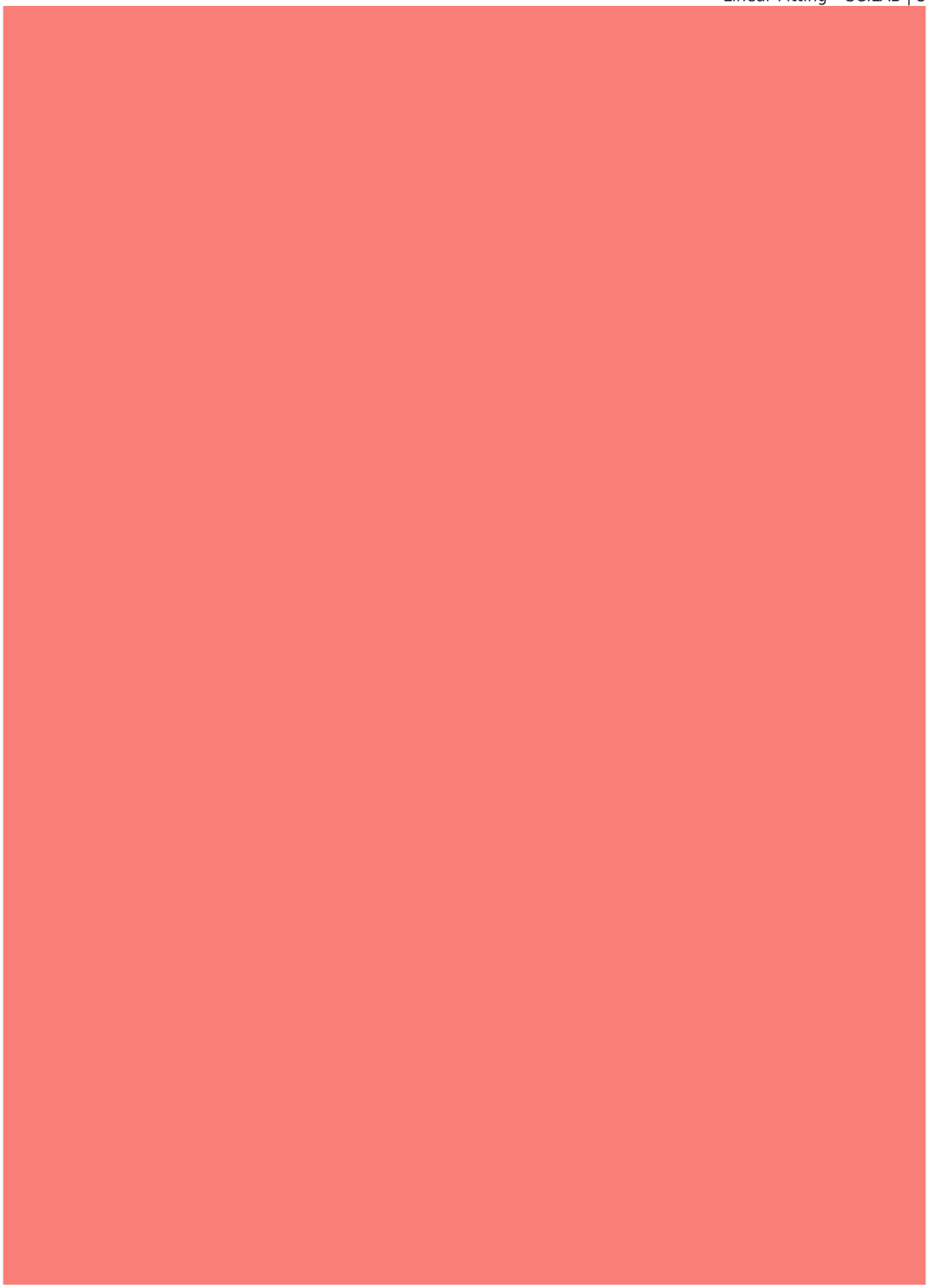

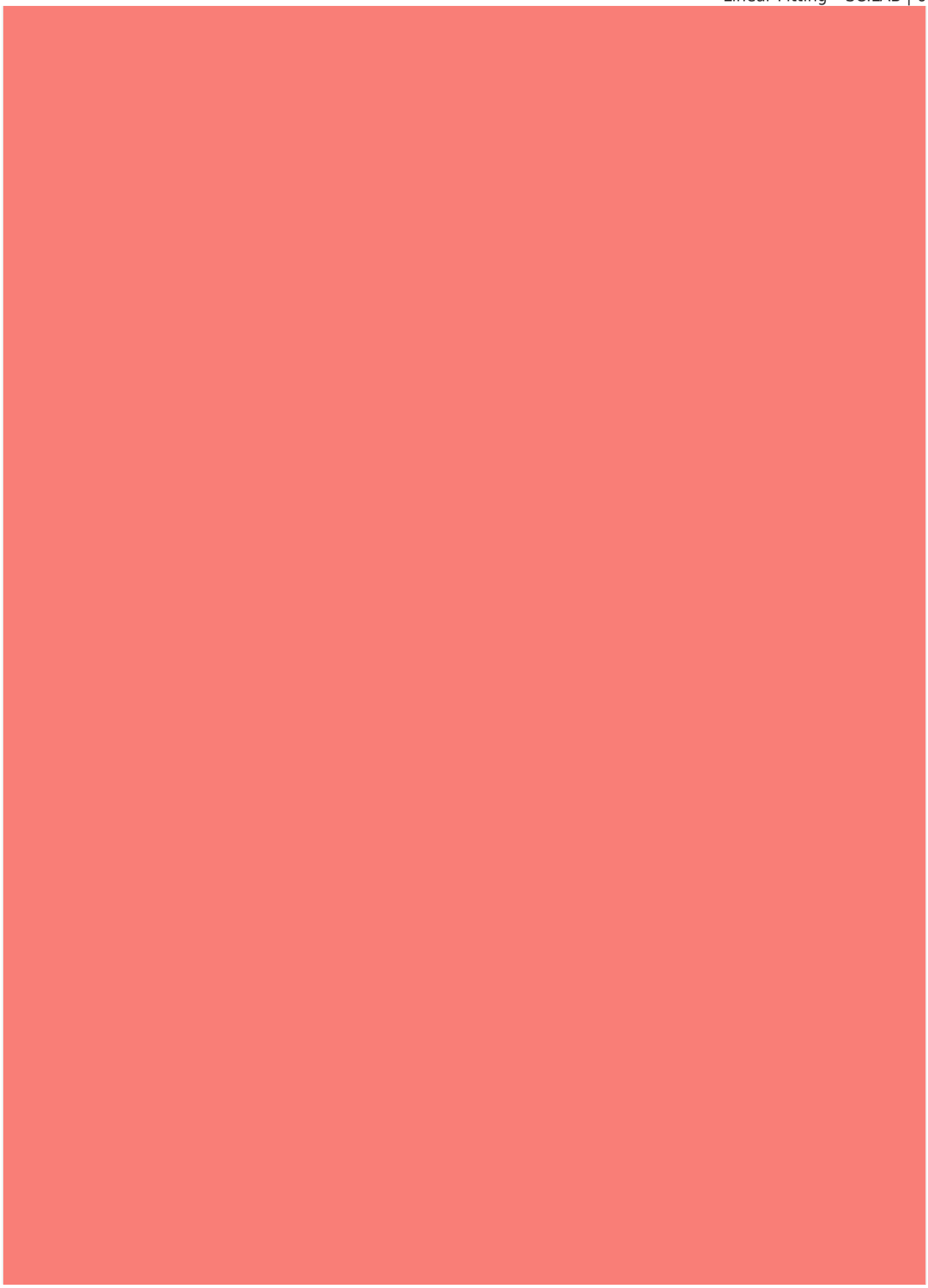

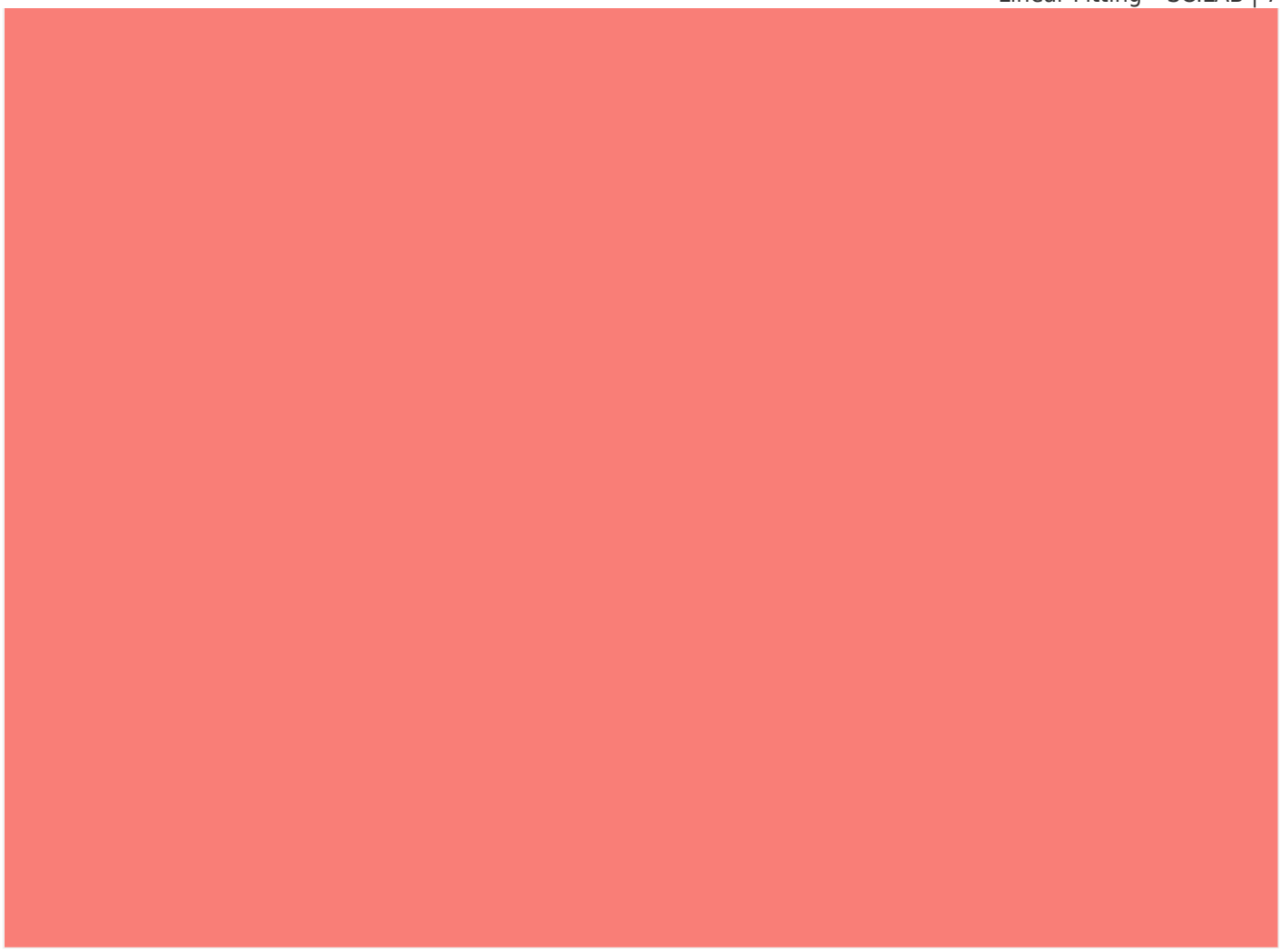

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