

8.8 Curve fitting using Scilab

Fitting functions to a given data set.

X, Y data is given. You need to write a Scilab program as follows.

The program given below is for an exponential fit

```
X= (0.1:0.2:2.1);
```

```
Y=[0.9,0.75,0.6,0.5,0.4,0.33,0.27,0.20,0.18,0.15,0.13];
```

```
function y=FF(x,p), y=exp(-p*x), endfunction
```

```
Z=[Y;X];
```

```
//The criterion function
```

```
function e=G(p,z),
```

```
    y=z(1),x=z(2);
```

```
    e=y-FF(x,p),
```

```
endfunction
```

```
//Solve the problem
```

```
p0=0.8
```

```
[p, err]= datafit(G,Z,p0);
```

```
scf(0);clf()
```

```
plot2d(X, Y,-1) // the plot with data given by us.
```

```
plot2d(X,FF(X,p),12) //the plot with fitting function.
```

In the above program FF is the fitting function, here it is exponential function. Here Z is a 2 x n matrix (here n is number of data points given) and two rows corresponds to Y and X data. Therefore you need to give the data of X and Y, in a single row (i.e. X and Y should be 1 x n matrices). In the above program the Z is looks like this

Z =

```
0.9 0.75 0.6 0.5 0.4 0.33 0.27 0.2 0.18 0.15 0.13
0.1 0.3 0.5 0.7 0.9 1.1 1.3 1.5 1.7 1.9 2.1
```

Then you need to write criterion function as shown in the program to define error bars.

But we can't see any variables of this function on the screen. Now you have to give the initial p value p0. Then it starts iteration using the command [p, err] = datafit(G,Z,p0);

Here we can see the final p and err values on the screen. Then you have to

to commands given in the above program.

