This file shows an example of a spreadsheet used to find the "best" fit of a function to a set of data. The example used is the function:

$$f(X)=a*\exp(b*X)$$

The definition of best in this case is the function which gives the minimum sum of the squares of the errors of the function compared to the data (the infamous Least Squares fit). The data is shown in the two columns marked "X" and "Y". The function result is shown in the column "f(X)". "Error" is f(X)-Y. "Sq. Error" is the square of Error. "a" and "b" are the coefficients of the equation f(X) which are manipulated to find the minimum sum of the squares of the errors, "SSE". For interest, the average, maximum and minimum errors are also shown.

This technique is best used when no existing dedicated program exists to fit the function you are interested. For linear functions or polynomials, good tools already exist to find the best fit. It is only when unusual functions are required, complicated non-linear functions, that this technique is preferable. This technique is best used for functions which are difficult or time consuming to compute by hand, and which are seldom used. It allows a general method which is adaptable to many forms of functions to be available without the time and effort of writing a dedicated program. It is slower than a dedicated program, so if speed of execution is an important factor, you should consider writing a Fortran or Basic program to do your curve fit.

	A	B	C	D	E	F	G	H
1	X	Y	f(X)=	Error	Sq. Error		a=	1.21
2			a*exp(b*X)				b=	2.4
3							SSE=	.9719085
4	0	.9444343	1.21	.2655657	.0705251		av. err.	.0159869
5	.1	1.579790	1.538211	-.041578	.0017288		max err.	.5482521
6	.2	1.725657	1.955450	.2297928	.0528047		min err.	-.426827
7	.3	2.761317	2.485864	-.275453	.0758743			
8	.4	3.133697	3.160153	.0264562	.0006999			
9	.5	3.941739	4.017341	.0756024	.0057157	This example shows		
10	.6	4.764679	5.107042	.3423631	.1172125	how to curve fit		
11	.7	6.919150	6.492323	-.426827	.1821812	an arbitrary fcn		
12	.8	8.245458	8.253360	.0079019	.0000624	to a set of data		
13	.9	9.943824	10.49208	.5482521	.3005803	by using a spread-		
14	1	13.53522	13.33804	-.197180	.0388801	sheet to minimize		
15	1.1	17.24235	16.95598	-.286374	.0820103	the sum of the		
16	1.2	21.69043	21.55527	-.135158	.0182678	square of the		
17	1.3	27.33829	27.40212	.0638252	.0040737	errors (SSE).		
18	1.4	34.87685	34.83492	-.041931	.0017582	Manipulate a and b		
19	1.5	44.14578	44.28386	.1380878	.0190682	in cells H1 and H2		
20	1.6	56.31739	56.29582	-.021567	.0004652	for your answer.		

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