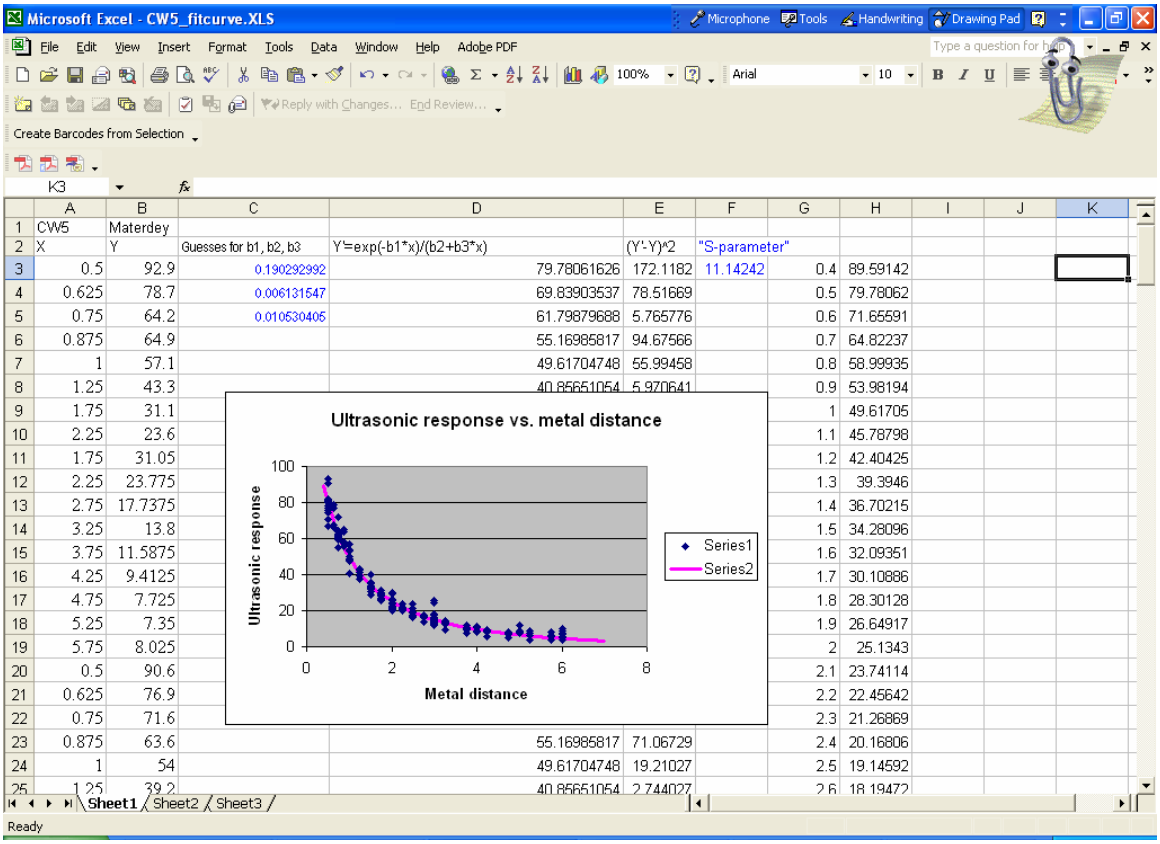
Engin 103
Fall ‘06
Meeting #11: October 5, 2006

In the previous class we started CW5 by importing data from the link in CW5 as follows: 1)Select both columns of data; 2)paste into column A of new spreadsheet; 3)Under “Data”, select “Text to columns”; within the Text to columns dialog window select “Fixed width”, then move line cursor to correctly separate both columns; then hit “Finish”; 4)Swap column A and B by inserting a new column A, then cut column C and paste into new column A. Now column A is X=metal distance; and column B is Y=Ultrasonic response.

Today we implemented the model Y’=exp(-b1*X)/(b2+b3*X), which is an exponential divided by a linear polynomial. We are using 3 parameters for this model: b1, b2, and b3. The process of obtaining the best exponential model using Excel is similar to previous applications using polynomial models. The modifications with respect to the spreadsheet using polynomial model for the periods and lengths of a pendulum are:

1) Here we are dealing with 245 pairs of data instead of 4 as with the pendulum
2) We will place initial guesses in cells C3, C3, and C5 for the parameters b1,b2,b3, respectively
3) We implement this formula for the exponential model in cell D3: =exp(-C3*A3)/(C4+C5*A3)
4) In cell G3 we start the second X series (for the curve) at 0.4 (to cover the X data from 0.5 to 5.75); then in G4 we use “=G3+.2”; then copy G4 until we get 6.
5) We copy the formula in cell D3 to H3, making sure X is being called by G3, not E3.

Final result after Solver will look like this:



Remember to use just line and not markers for the curve associated with the series containing your model.

Suggested items to write in the Engin 103 logbook:

1) **Write in your own words the steps to achieve the mentioned exponential model for the ultrasonic response versus metal distance from the NIST website.**
2) **Overview of the process of data modeling using Excel: what are the common and distinctive steps between doing a polynomial and an exponential model?**

Items due next class:

-Project 1 presentations using data of your choice.