

## MTH/CSC 440 - Prof. Richard B. Goldstein - Computer HW #3

Project Report – same steps as in computer hw #1 and #2

### Discrete Least Squares Curve Fitting

Data from text – Section 8.1 #9, 11, or 12

Algorithm: Use Curve Expert 1.3 (version 1.38) by Daniel Hyams  
Under Apply Fit choose and compare at least 3 models. For example, some options are: polynomial, exponential, power law, or sigmoidal model like logistic

Location: N Drive: math\_cs/rgoldstn/mcs440  
download: <http://curveexpert.webhop.net>  
download: <http://crocoite.chim.unipr.it/domiano/didattica/graffunz.html>

### Minimum Absolute Error Fitting

Data from text – Section 8.3 #1a ( $e^x$  on  $[-1, 1]$ ) or 1c ( $\ln(x + 2)$  on  $[-1, 1]$ )

Algorithm: (1) Use my JavaScript routine for Divided Differences (dd3.htm) to get the initial estimates of the third and fourth degree polynomial fits (in bottom textarea)  
(2) Next use Excel workbook MinAbsPoly.xls with Solver (Tools | Solver) for which you may first need to first install Solver by Tools | Add-Ins.

Location: Divided Differences: <http://www.providence.edu/mcs/rbg/numeranaly/dd3.htm>  
Excel Routine: <http://www.providence.edu/mcs/rbg/numeranaly/MinAbsPoly.xls>

### Rational Function Approximation

Data – Fit one of the following functions:  $e^x$ ,  $\ln(1 + x)$ ,  $2^x$ ,  $\sqrt{1 + 0.4x}$ ,  $\tan(x)$

Algorithm: (1) Use either *Derive*: enter the function (e.g. [Ctrl]+e ^ x will produce  $e^x$ ) and select Calculus | Taylor Series  
or *Mathematica*: type: Series[E^x, {x,0,5}] then [Shift]+[Enter]  
(2) alg081.for from textbook