9-18-2005
Opening Discussion

- What did we talk about last class?
- Do you have any questions about the assignment?
Interpolation is the process of estimating values between data points. What methods does Matlab give for you to do this?

Let's play with some 1-D interpolation and see how the different methods work.
Matlab can also do 2-D interpolation with interp2. This is easy to do if you have a 2-D array of data and want to find one point.

To construct a finer mesh we need the meshgrid function that will give us an easy way to represent all points on a grid. It takes two 1-D arrays and returns two 2-D arrays.

Let's play with this as well. We can use the mesh function to plot out surfaces.

We can also try to redo our Mandelbrot in such a way that we can use the surface plotting and try to do it without loops.
Matlab provides a simple mechanism for us to deal with polynomials. Row arrays are can be viewed as the coefficients on polynomials.

Given this form, roots finds the roots of that polynomial.

Given the roots, poly will return the polynomial with those roots. (This one can be fairly easily done by hand.)

The conv function will multiply two polynomials.

Addition can be done easily if the polynomials have the same number of terms. Otherwise one will need to be padded with zeros.

For division use deconv.
Calculus and Evaluation

- You can take derivatives of polynomials with polyder.
- You can integrate a polynomial with polyint. Remember that this must be passed in a constant along with the polynomial.
- The polyval function will evaluate a polynomial at one value or for an array of values.
- Given data, you can use the polyfit to fit a polynomial to it. The arguments are the x and y values followed by the order of the polynomial you want back.
- In general you should use lower order polynomials, they are typically better behaved.
- It turns out this is just a wrapper function for solving a system of linear equations, typically a system that is overspecified.
Reminders

- Assignment #3 is due tonight by midnight.
- You have a quiz at the beginning of next class. The quiz will be open book and open Matlab.