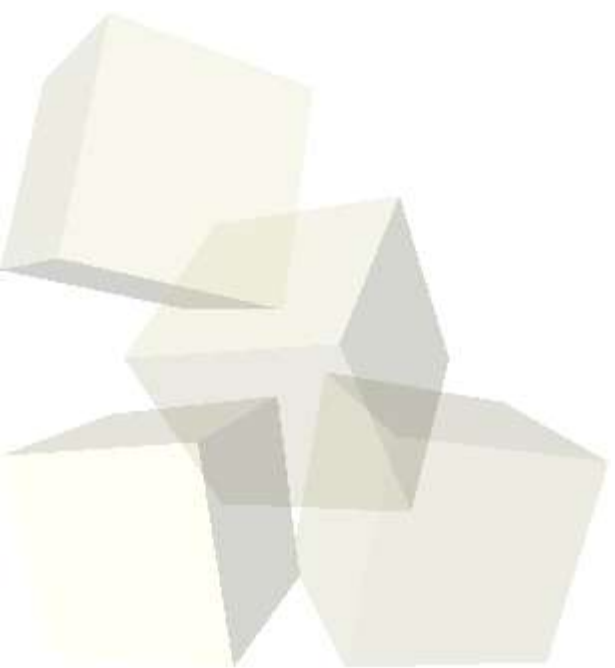




Data Fitting

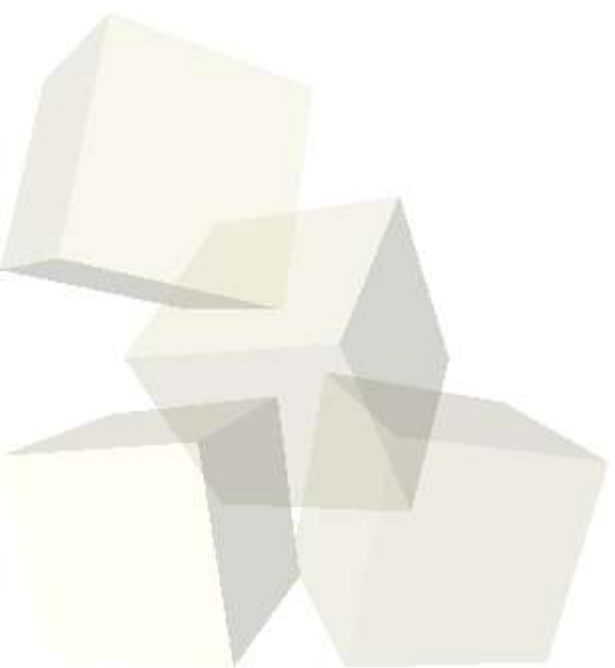
9-18-2005





Opening Discussion

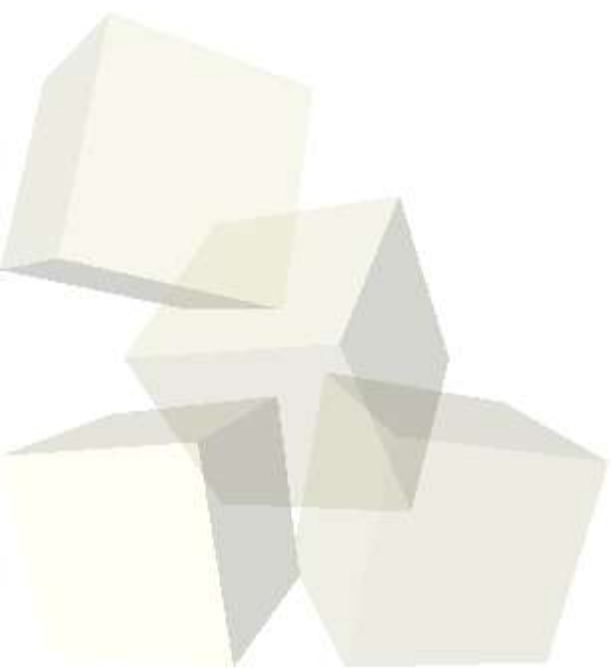
- What did we talk about last class?
- Do you have any questions about the assignment?





Data Interpolation

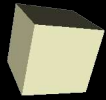
- Interpolation is the process of estimating values between data points. What methods does Matlab give for you to do this?
- Let's play with some 1-D interpolation and see how the different methods work.





2-D Interpolation

- 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.
- Lets 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.



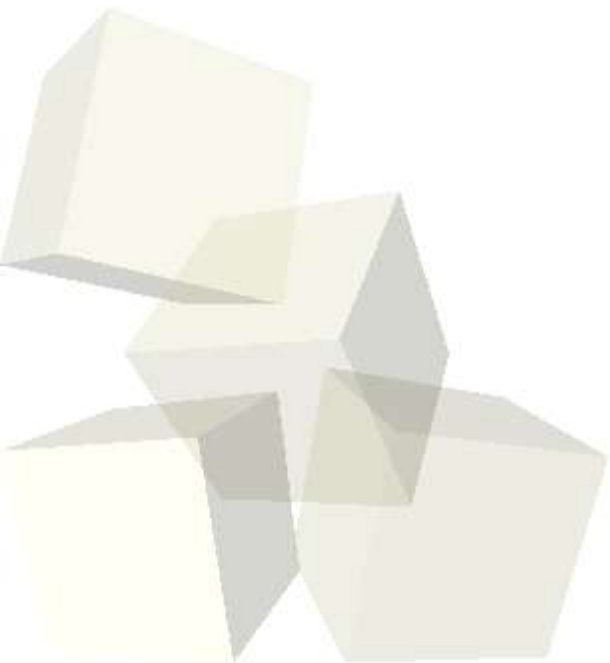
Polynomials

- 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.



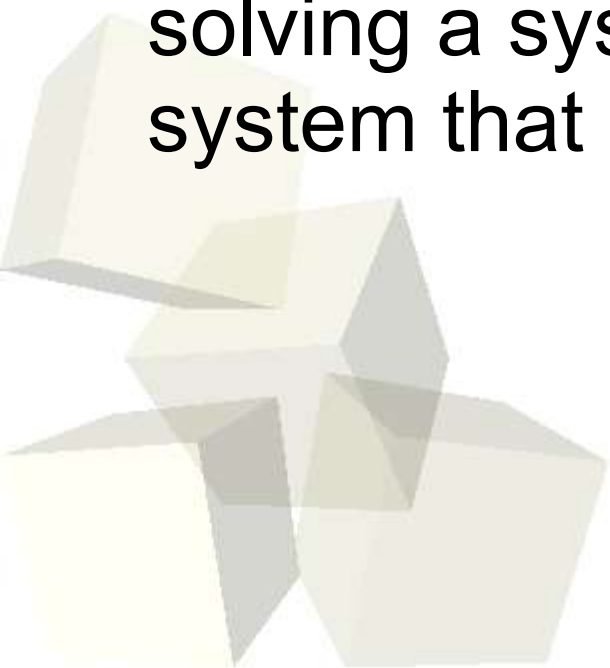
Calculus and Evaluation

- 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.

