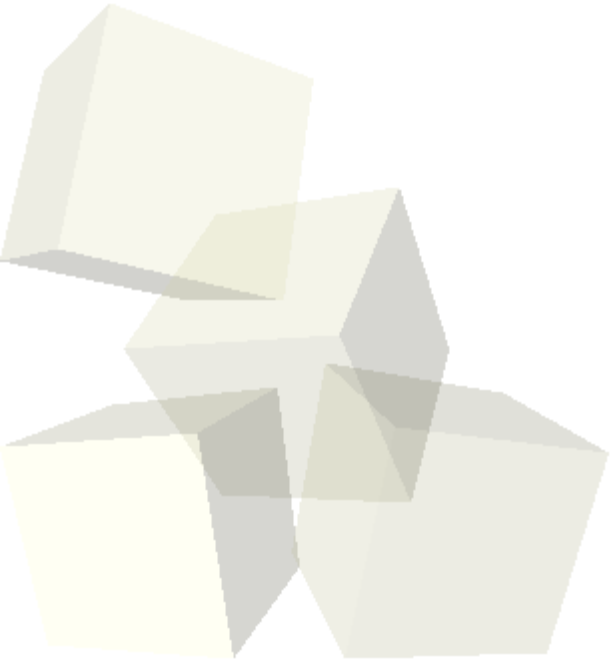
Systems of Eqs and Vector Math

2/11/2008

Opening Discussion

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



Fitting Data as a Linear Eq

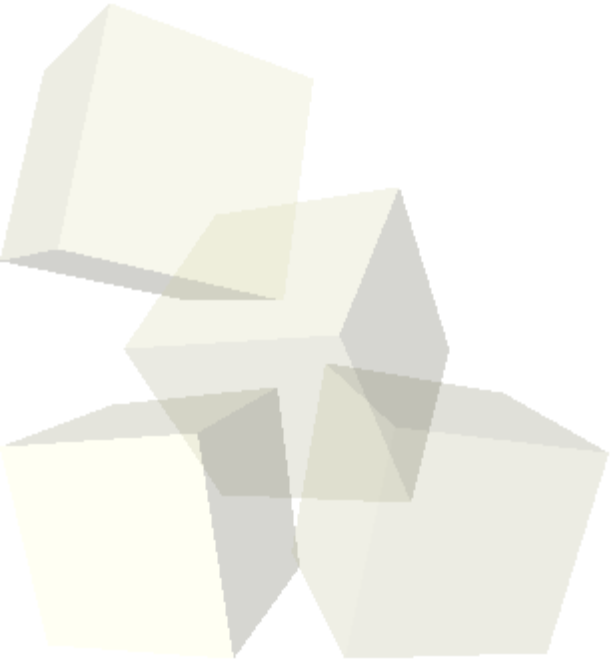
- The process of fitting data points to a linear combination of functions can be viewed as solving a system of linear equations.
- Given points $(x_1,y_1)...(x_n,y_n)$ and functions $f_1(x)...f_n(x)$ we fill in the A matrix with $A_{ij}=f_j(x_i)$ and let the y values be the y vector. Solving gives us the proper coefficients.
- If it is overdetermined this process will give us the values from a least-squares fit.

Non-Linear Equations

- What if you want to do something like perform an exponential fit?
- In general we'd have to do a different procedure with non-linear optimization.
- If the fitting function isn't too complex though you can sometimes convert it to a linear form using a bit of algebra.

Physics and Vectors

- With the time remaining lets talk about some concepts of N-body simulations and how they would appear in Matlab.
- N-body simulations involve a number of discrete particles. These particles feel various forces.
- The locations, velocities, and forces are all represented as vectors. In Matlab these can be just arrays and the language simplifies how we express the math.

Closing Remarks

- Quiz #2 is next class.