

## Quiz #4

Due in class, Friday, August 1, 2003

### Least Squares

Submit full, clear reasoning; this will help us give you partial credit. You may consult only the proctor. Closed book and closed notes. You will have as much of today's section as necessary.

1) Clearly expound about 3 consecutive topics listed below pertaining to the least squares problem and its solution. Limit your writings to about a paragraph or two to each selected topic.

1. The scientist's model for plant growth versus soil nutrients and the least squares problem statement.
2. QR factorization
3. Orthogonal matrices, their key property and why it's key to this problem.
4. Rotations and how we get Q and R.
5. The least squares solution
6. Condition of a rectangular matrix and solution sensitivity
7. Cholesky and how it attacks the least squares problem.

As is germane, you should include motivation and intuition; you should make definitions where it facilitates exposition and introduce and develops tools that facilitate solving the problem; you should also include results about the problem.

A good solution would consist mostly of facts, read like the text with all the fluff and off-topics (those not stressed in class) removed, have all gaps in reasoning filled, include any extra insights of your own and be written in the jargon of a numerical analyst.