STA 4102/5106: Homework Assignment #2

(Wednesday, September 3)
Due: Wednesday, September 10

1. Write a Matlab program to implement *backsub* and test your program by solving the following system of equations:

$$\begin{pmatrix} 6 & 3 & 9 & 2 \\ 0 & 4 & 6 & 1 \\ 0 & 0 & 8 & 8 \\ 0 & 0 & 0 & 5 \end{pmatrix} \begin{pmatrix} b_1 \\ b_2 \\ b_3 \\ b_4 \end{pmatrix} = \begin{pmatrix} 1 \\ 4 \\ 6 \\ 1 \end{pmatrix}$$

2. Write a Matlab program to implement *house* and execute it with x = $(1.4, 5.8, 2.3, 8.1, 9.0)^T$.

3. Write a Matlab program to implement *rowhouse* and execute it with

$$X = \begin{pmatrix} 1.4 & 4.5 & 6.5 \\ 5.8 & 3.2 & 7.3 \\ 2.3 & -2.6 & 8.2 \\ 8.1 & -5.8 & -8.0 \\ 9.0 & 0.3 & 1.5 \end{pmatrix}$$

and *v* generated from problem 2.

4. Write *multilinreg* program in Matlab to solve the following regression problem: find least-square estimate

$$\hat{b} = \arg\min_b \| y - Xb \|^2$$

where

$$X = \begin{bmatrix} 5 & 0 & 9 & 3 \\ 3 & 6 & 8 & 9 \\ 4 & 4 & 9 & 6 \\ 0 & 3 & 1 & 8 \\ 2 & 8 & 2 & 3 \end{bmatrix} \quad \text{and} \quad y = \begin{bmatrix} 20 \\ 17 \\ 32 \\ 10 \\ 12 \end{bmatrix}$$