

## ASE 211 Homework 4

Due: 12:00 noon, Friday, February 18. Put assignments in the drawer on the third floor of WRW marked 'ASE 211.'

1. By hand, compute the LU decomposition of the following matrix:

$$A\mathbf{x} = \begin{bmatrix} 3 & 2 & -1 \\ 6 & 1 & 0 \\ -3 & 6 & 4 \end{bmatrix}.$$

2. For the matrix in problem 1, use forward and backward substitution to solve  $A\mathbf{x} = \mathbf{b}$ , where

$$\mathbf{b} = \begin{bmatrix} 8 \\ 16 \\ 42 \end{bmatrix}.$$

3. Using the Matlab built-in `lu` command, repeat question 1.

4. Write Matlab *m*-files `forsolve.m` and `backsolve.m` which perform forward and backward substitution, given the LU decomposition of the matrix. Test your *m*-files on the system given in problems 1 and 2.

5. Use the Matlab code you have written in problems 3 and 4 to solve the system in problem 3.36 in the book, with the four different right hand sides given. Remember you only have to do the LU decomposition once.

Hand in all matlab *m*-files and diaries.