

## ESO 208A; ESO 218

### Computational methods in engineering

#### Tutorial # 4

September 5, 2013

1. Solve the following system of equations using  $LU$  decomposition with partial pivoting:

$$2x_1 - 6x_2 - x_3 = -38$$

$$-3x_1 - x_2 + 7x_3 = -34$$

$$-8x_1 + x_2 - 2x_3 = -20$$

2. Determine  $\|A\|_e$ ,  $\|A\|_1$ ,  $\|A\|_\infty$  for

$$[A] = \begin{bmatrix} -6 & -2 & 5 \\ 8 & 1.1 & -2.5 \\ -3 & -1 & 10.3 \end{bmatrix}$$

Scale the matrix by making the maximum element in each row equal to one.

3. Use iterative refinement technique to improve  $x_1 = 2$ ,  $x_2 = -3$ , and  $x_3 = 8$ , which are approximate solutions of

$$2x_1 + 5x_2 + x_3 = -5$$

$$5x_1 + 2x_2 + x_3 = 12$$

$$x_1 + 2x_2 + x_3 = 3$$