ESO 208A; ESO 218

Computational methods in engineering

Assignment # 4

Due date: September 12, 2013

1: Solve the following system of equations using *LU* decomposition without 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 the total flops as a function of the number of equations n for the (a) decomposition, (b) forward-substitution, and (c) back-substitution phases of the *LU* decomposition version of Gauss elimination.

3: Use *LU* decomposition to determine the matrix inverse for the following system. Do not use a pivoting strategy. And check your result by verifying that $[A] [A]^{-1} = [1]$.

$10x_1 + 2x_2 - x_3 = 27$

$-3x_1 - 6x_2 + 2x_3 = -61.5$

$x_1 + x_2 + 5x_3 = -21.5$

4: Solve the following set of equations with *LU* decomposition:

$3x_1 - 2x_2 + x_3 = -10$

$2x_1 + 6x_2 - 4x_3 = 44$

$-x_1 - 2x_2 + 5x_3 = -26$