Numerical Linear Algebra –Project 3

Due on Dec 01

Requirements:

i) Output all theoretical proofs, statements, numerical results and conclusions in a tex file. Use the template on Sakai.

ii) Compress all related files (including .tex file, .pdf file, .m file, and .mat file) into a zip file and upload the zip file to the dropbox.

iii) Late assignment will not be accepted

1. Theoretical Part:

20.1, 20.3, 21.1, 21.3, 23.1

2. Numerical Experiments: (m files and mat files are required to submitted for the following problems)

- Given the following system of equations

$$\begin{aligned} 3x_1 - 4x_2 + 9x_3 - x_4 &= 8 \\ -2x_1 + 6x_2 - x_3 - 7x_4 &= 7 \\ x_2 - x_3 - x_4 &= 0 \\ 7x_1 - x_2 + 6x_3 - 5x_4 &= 11 \end{aligned}$$

  Solve the system using LU factorization (Algorithm 20.1)

- Use **PA = LU** factorization with pivoting (Algorithm 21.1) to solve the linear system

$$\begin{pmatrix} 4.0 & 2.0 & -1.0 & 3.0 \\ 3.0 & -4.0 & 2.0 & 5.0 \\ -2.0 & 6.0 & -5.0 & -2.0 \\ 5.0 & 1.0 & 6.0 & -3.0 \end{pmatrix} \begin{pmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{pmatrix} = \begin{pmatrix} 16.9 \\ -14.0 \\ 25.0 \\ 9.4 \end{pmatrix}$$

- **23.3**