CVG2181 Numerical Methods in Civil Engineering **Winter 2016**

Assignment 3 **Due: Monday, February 22 4:00 pm**

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1 (15)- Solve the specified problem of laboratory 3.

2 (35)- The following systems of equations are given,

System 1:

$$\begin{cases} 7y + 2z = 3 \\ 18z = 2 \\ x + 2y = 1 \end{cases}$$

System 2:

$$\begin{cases} 9a + 3b + 5c = 17 \\ 7a + 5b + c = 13 \\ a + 2b + 4c = 7 \end{cases}$$

a- Determine if **system 1** can be solved by LU method. If not, properly convert **system 1** to a new system that can be solved by LU method. Write the system in a matrix form.

b- Solve **system 2** using LU method.

3 (30)- Consider the following system of equations:

System 3 :

$$\begin{cases} 6x + y + 2z = 7 \\ x + 7y + 5z = -1 \\ 2\alpha x + (\frac{\beta}{4})y + 17z = 14 \end{cases}$$

a- Determine $\alpha \; and \; \beta$ so one can solve **system 3** using Cholesky's method.

b- Use Cholesky's method to solve **system 3**.

4 (20)- Use your results of Problem **3-a** (lower and upper triangular matrices S and S^T):

a- Find the inverse of coefficients matrix (A^{-1}) for **system 3**.

b- Solve **system 3** using the inverse matrix A^{-1}.