**NUMERICAL METHODS – HW2 and HW3**

You can write your answers in English or Turkish, however, it is encouraged to use the English. Please use the given word template (in the uzem website), send it as pdf.

Q1 (20 Points). Determine the real roots of the following equation with Gaussian Elimination (show all details while solving):

$$x_1 - x_2 + 3x_3 = 1$$
$$x_1 - x_2 + x_3 = -3$$
$$5x_1 - x_2 - x_3 = 5$$

Q2 (20 Points). Determine the real roots of the following equation with Gauss-Jordan Elimination (show all details while solving):

$$x_1 - x_2 + 3x_3 = 1$$
$$x_1 - x_2 + x_3 = -3$$
$$5x_1 - x_2 - x_3 = 5$$

Q3 (20 Points). Determine the real roots of the following equation with LU decomposition:

$$x_1 - x_2 + 3x_3 = 1$$
$$x_1 - x_2 + x_3 = -3$$
$$5x_1 - x_2 - x_3 = 5$$

Q4 (20 Points). Determine the real roots of the equation with Jacobi Iterative Method. Use three iterations

$x_0 = \begin{bmatrix} 0.5 \\ 0.5 \\ 0.5 \end{bmatrix}$

$$x_1 - x_2 + 3x_3 = 1$$
$$x_1 - x_2 + x_3 = -3$$
$$5x_1 - x_2 - x_3 = 5$$

Q5 (20 Points). Determine the maximum of the equation with Newton Raphson Method ( $x_0 = 1$ ). Use three iterations

$$f(x) = x^3 - x + 5$$