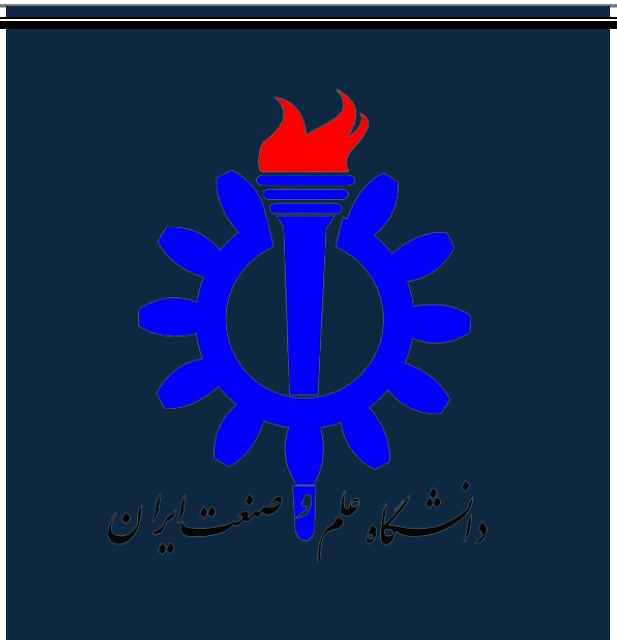

Linear control systems

Problems Series 1

- **Question 1:** Plot the following functions using MATLAB, and then sample them using the stem function. (Try to use the visual effects taught in the MATLAB training class when creating your plots.)
  - Exp(x)
  - Unit step(u(t))
  - Cos(s)
  - Rectangular pulse
  - Triangular pulse
  - Chirp
- **Question 2:** Given the matrices

$$A = \begin{bmatrix} 4 & -2 & 1 \\ 6 & 8 & -5 \\ 7 & 9 & 10 \end{bmatrix} \quad B = \begin{bmatrix} 6 & 9 & -4 \\ 7 & 5 & 3 \\ -8 & 2 & 1 \end{bmatrix} \quad C = \begin{bmatrix} -4 & -5 & 2 \\ 11 & 6 & 1 \\ 3 & -9 & 8 \end{bmatrix}$$

a. Verify associative property:

$$A(B+C)=AB+AC$$

b. Create a three-dimensional array D whose three "layers" are matrices A, B, and C. Then, find largest element in each layer of D and the largest element in D.

c. Replace the third row of the C matrix with the sum of second row in the array resulting from element by element multiplication of of the A and B matrices.

- **Question 3:** solve the system of equations:

$$2x_1 + 3x_2 + x_3 = \textit{your last digit of your student code}$$
$$4x_1 + 5x_2 + 11x_3 = \textit{The seventh digit of your student code}$$
$$9x_1 + 8x_2 + 4x_3 = \textit{The sixth digit of your student code}$$

Good luck

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