Assignment-2 (only for Section A2)

Date of Submission: 08.11.2024

Q1.

a. Determine all possible signals $x(n)$ associated with Z-transform

$$X(z) = \frac{(1/4)z^{-1}}{[1-(1/2)z^{-1}][1-(1/4)z^{-1}]}$$

b. A causal system has input x(n) and output y(n). Find the system function, frequency response and impulse response of the system if

$$x(n) = \delta(n) + \frac{1}{6}\delta(n-1) - \frac{1}{6}\delta(n-2)$$

Q2.

a. Compute the DFT of the square wave sequence

$$x(n) = \begin{cases} 1, & 0 \le n \le \left(\frac{N}{2}-1\right) \\ -1, & \frac{N}{2} \le n \le N \end{cases}$$

Using Radix-2 DITFFT Algorithm, where N is even.

b. An 8-point sequence is given by x(n) = {2, 2, 2, 2, 1, 1, 1, 1}.

Compute the 8-point DFT of x(n) by

(a) Radix-2 DIT FFT algorithm

(b) Radix-2 DIF FFT algorithm