DSP Assignment 2

5Th Semester, Fall 2021 (CLO-1)

Q.1 Find the z-transform of the following signals using properties of z-transform. Also mention the property used at each step.

(a) $x_1[n] = n(\frac{1}{3})^{n-2}u[n-1]$

(b) $x_2[n] = u[n-1] - (\frac{1}{3})^{-n}u[-n-1]$

(c) $x_3[n] = x_1[n] * x_2[n-1]$

Q.2 Find the Systems function for the causal LTI Systems described by the following constant-coefficient linear difference equations and plot their pole-zero pattern. Also determine if the systems is stable or unstable.

(a) $y(n) = \frac{3}{4}y(n-1) - \frac{1}{8}y(n-2) + x(n)$

(b) $y(n) = y(n-1) - 0.5y(n-2) + x(n) + x(n-1)$

(c) $H(z) = \dfrac{z^{-1}(1+z^{-1})}{(1-z^{-1})^3}$

(d) $y(n) = 0.6y(n-1) - 0.08y(n-2) + x(n)$

(e) $y(n) = 0.7y(n-1) - 0.1y(n-2) + 2x(n) - x(n-2)$

The due date for assignment 2 is Thursday 13th January 2022, and the corresponding quiz will also be held on Thursday 13th January 2022.