DSP Assignment I

01/04/2024

1. Find ZT of $x(n) = \left[n(-0.5)^n u(n) * 4^n u(-n) \right]$

2. Find IZT of $X(z) = \dfrac{z^4 + z^2}{z^2 - 0.75z + 0.125}$

with ROC: $|z| > 0.5$

3. A DT- LTI System represented by difference equation $y(n) = y(n-1) + y(n-2) + x(n-1)$

(i) Find System Function
(ii) Indicate ROC if System is stable
(iii) Indicate ROC if system is causal
(iv) obtain impulse responses in both cases

4. Determine whether the system

$$H(z) = \frac{2z+1}{z^2 + z - 5/16}$$ is causal and stable?

5. Find DTFT of $x(n) = \left(\frac{1}{4}\right)^n \cdot \sin\left(\frac{n\pi}{4}\right) \cdot u(n-1)$

6. Find frequency response and impulse responses of the system having input and output as follows

$$x(n) = \left(\frac{1}{2}\right)^n u(n)$$

$$y(n) = \frac{1}{4}\left(\frac{1}{2}\right)^n u(n) + \left(\frac{1}{4}\right)^n u(n)$$

Submit on or before 05/04/2024