ECE355: Problem Set 04

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Problem 1

Requirements

$$\text{Causal}: \quad h[n] = 0 \quad \forall n < 0 \tag{1}$$

$$\text{Stable}: \quad \sum_{n=-\infty}^{\infty} |h[n]| < \infty \tag{2}$$

Part a)

Causal: Not causal due to the $u[n+2]$ term which makes the function non-zero for $n < -2$.

Stable: Here $(0.8)^n$ goes to 0 as n goes to ∞. Which makes the sum finite and therefore stable.

$\therefore$ Stable and Not Causal

Part b)

Causal: Not causal due to the $u[3-n]$ term which makes the function non-zero for $n > 3$.

Stable: Not stable due to the 5^n term which makes the sum infinite.

$\therefore$ Not Stable and Not Causal

Part c)

Causal: Not causal due to the $u[1-n]$ term which makes the function non-zero for $n < -1$.

Stable: Stable since $(-\frac{1}{2})^n$ would go to 0 and $\sum_{n=-\infty}^{\infty}(1.01)^n$ is finite.

Problem 2

Part a)

Part b)

Part c)

Problem 3

Problem 4

Part a)

Part b)

Part c)

Problem 5

Part a)

Part b)

Problem 6

Problem 7