

Exercises Week 8

DSP

Left-over exercise from last week:

2. A causal LTI system has the property that if the input signal is

$$x[n] = \left(\frac{1}{3}\right)^n u[n] - \frac{1}{4} \left(\frac{1}{3}\right)^n u[n-1],$$

then the output signal is

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

- a. Find the system function $H(z)$, draw the pole-zero diagram
- b. Compute the impulse response $h[n]$ of the system
- c. Find the difference equation of the system
- d. Characterize the system with respect to:
 - length of impulse response (FIR or IIR)
 - implementation (recursive or non-recursive)
 - stability