

Hw1

Sept. 24, '15

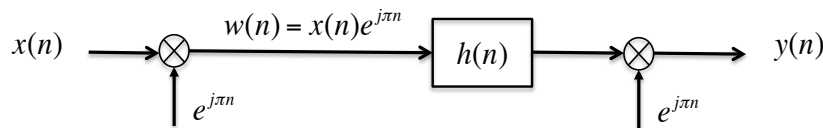
Answers without justifications will not be given credits

- Consider the 5-point moving average system. Let the input $x(n) = u(n)$.
 - Compute and plot the output $y(n)$.
 - Is the system LTI? If so, identify the impulse response $h(n)$.
 - Is the system stable? Is it causal?
- Suppose a system whose output $y(n)$ is related to its input $x(n)$ by

$$y(n) = \begin{cases} x(n/2), & \text{if } n \text{ is even} \\ 0, & \text{otherwise.} \end{cases}$$

Determine whether the system has one or more of the following properties.

- linearity
 - time invariance
 - causality
 - stability
- * Consider the following system.
 - Express $y(n)$ in terms of $x(n)$ and $h(n)$.
 - Is the overall system from $x(n)$ to $y(n)$ LTI? Find the impulse response if it is.



- * MATLAB (optional, due next week in class) Let $h(n)$ be a 3-pt moving average system.
 - Let the input be $x(n) = 1$ for $n = 0, 1, \dots, 6$. Plot the output.
 - Let the input be $x(n) = (-1)^n$ for all n . Plot the output $y(n)$ for an appropriate range of n .
 - Compute $H(e^{j\omega})$ for $\omega = \pi$ and use it to obtain the output $y(n)$ in (b) by hand. Is the result the same as what you have in (b)?