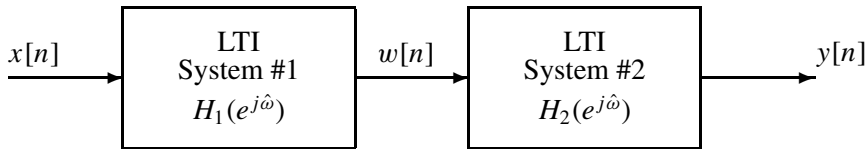


PROBLEM:

Consider the following cascade system:



Both systems are 4-point running average systems, i.e.,

$$H_2(e^{j\hat{\omega}}) = H_1(e^{j\hat{\omega}}) = \frac{\sin(2\hat{\omega})}{4 \sin(\hat{\omega}/2)} e^{-j3\hat{\omega}/2}$$

- Determine the frequency response of the overall system from the input $x[n]$ to the output $y[n]$.
- Plot the magnitude and phase of the overall frequency response for $-\pi \leq \hat{\omega} \leq \pi$.
- What is the total time delay (in samples) for the overall system?
- If the input is $x[n] = e^{j\hat{\omega}n}$, for which values of $\hat{\omega}$ will $y[n] = 0$?