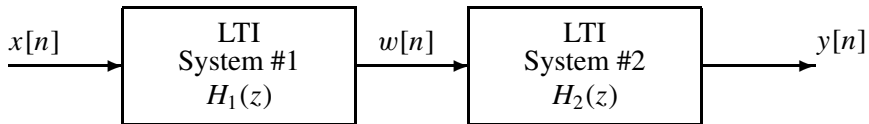


## PROBLEM:



The overall system function of the above system (from input  $x[n]$  to output  $y[n]$ ) is

$$H(z) = \frac{(1 - z^{-1})(1 + z^{-2})}{1 + 0.8z^{-1}}$$

- Determine system functions  $H_1(z)$  and  $H_2(z)$  such that System #1 is a FIR system (no feedback) and the overall system function is as given above.
- Is your answer to part (a) unique? Explain.
- Plot the poles and zeros of  $H(z)$  in the  $z$ -plane and sketch the magnitude of the overall frequency response for  $-\pi < \hat{\omega} < \pi$ .
- If the input is  $x[n] = e^{j\hat{\omega}n}$ , for what values of  $\hat{\omega}$  will  $y[n] = 0$ ?