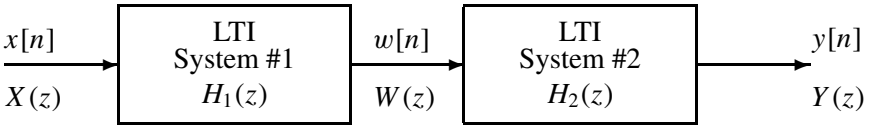
PROBLEM:

Consider the following cascade system:



It is known that

$$H(z) = (1 - z^{-2})(1 - 0.8e^{j\pi/4}z^{-1})(1 - 0.8e^{-j\pi/4}z^{-1})(1 + z^{-2})$$

(a) Determine the poles and zeros of $H(z)$ and plot them in the complex z-plane.

(b) It is possible to determine two possible system functions $H_1(z)$ and $H_2(z)$ so that: (1) the overall cascade system has the given system function $H(z)$ and (2) $w[n] = x[n] - x[n-4]$. Find $H_1(z)$ and $H_2(z)$.

(c) Determine the difference equation that relates $y[n]$ to $w[n]$ for your answer in part (b).