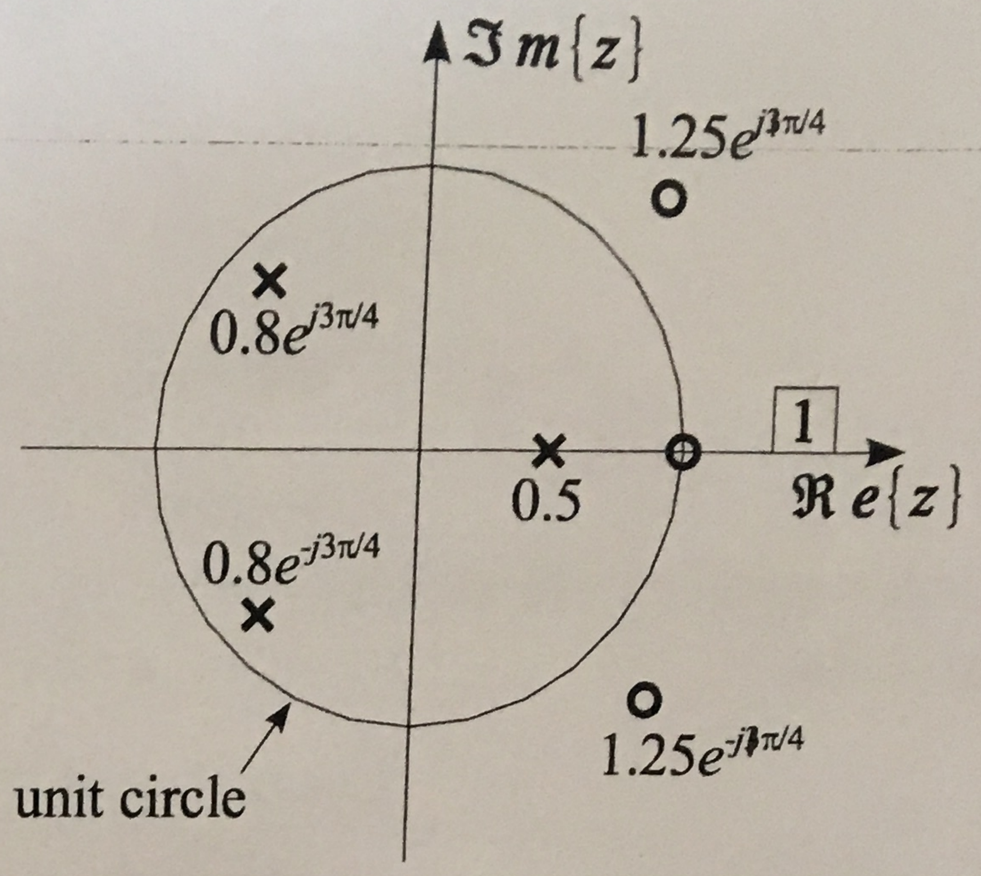
Question #5: (10 points)

Consider a causal and stable filter $H(z)$ described by the following pole-zero plot.

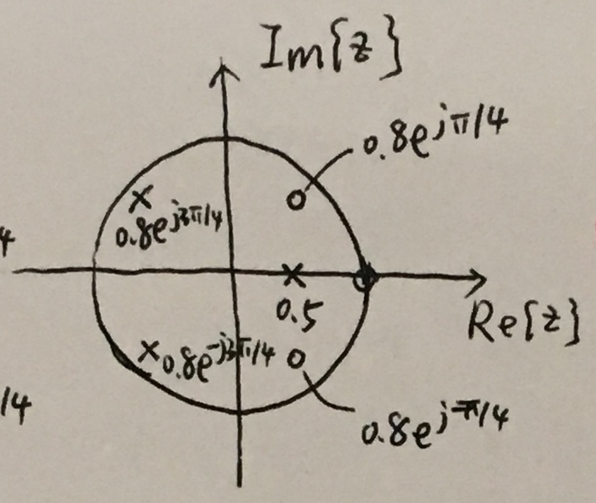


(a) Draw the pole-zero diagrams for a minimum-phase filter $H_{min}(z)$ and an all-pass filter $H_{ap}(z)$ that decompose $H(z)$ such that $H(z) = H_{min}(z)H_{ap}(z)$.

$H_{min}(z)$:

zeros ~~poles~~ $\frac{1}{1.25e^{j\pi/4}} = 0.8e^{-j\pi/4}$

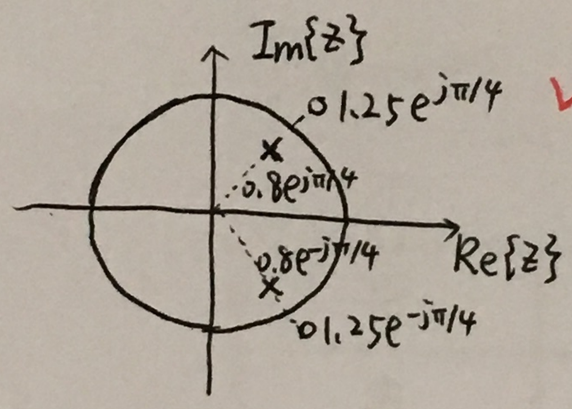
$\frac{1}{1.25e^{-j\pi/4}} = 0.8e^{j\pi/4}$



$(1 - 1.25e^{j\pi/4} \cdot e^{-j\omega})$

$H_{ap}(z)$:

poles: $0.8e^{j\pi/4}$, $0.8e^{-j\pi/4}$



(b) Sketch the magnitude of the frequency response $|H(e^{j\omega})|$ for the filter.