EE 327 Signals and Systems 1
Homework 10

1. Plot the poles and zeros of the following discrete-time transfer functions. Determine whether or not these systems are stable.

   a. $H(z) = \dfrac{z}{z - 0.2}$

   b. $H(z) = \dfrac{z}{z + 0.2}$

   c. $H(z) = \dfrac{z}{z - 1.2}$

   d. $H(z) = \dfrac{z^2}{z^2 - 0.6z + 0.08}$

   e. $H(z) = \dfrac{z^2}{(z + 0.5 + j0.5)(z + 0.5 - j0.5)}$

2. For each of the same systems described in the previous problem, use the pole-zero plots to sketch the magnitude frequency response (only if the systems are stable). Determine what type of filtering action each system performs.

3. Determine the steady-state response of

$$H(z) = \frac{z}{z + 0.9}$$

   to the input

$$x[n] = 1 + 5\cos\left(\frac{\pi}{4} n\right) + 10\cos\left(\frac{\pi}{2}\right)$$

   Determine an analytic expression for both the magnitude response and the phase response. Sketch the magnitude frequency response from $-\pi$ to π and label important points.