PROBLEM:

A discrete-time system is defined by the following system function:
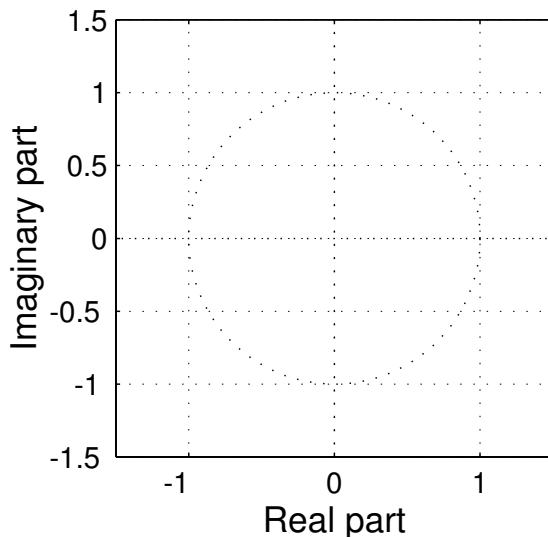
$$H(z) = \frac{0.81 + z^{-2}}{1 + 0.81z^{-2}}.$$

(a) Write down the difference equation that is satisfied by the input $x[n]$ and output $y[n]$ of the system.

(b) Fill in numbers for the vectors bb and aa in the following MATLAB computation of the frequency response of the system:

```
bb=[                    ];     aa=[                    ];

yy=filter(bb,aa,xx)
```

where xx is the input signal to be filtered.

(c) Determine *all* the poles and zeros of $H(z)$ and plot them in the z-plane.

(d) Compute $|H(e^{j\hat{\omega}})|^2 = H(e^{j\hat{\omega}})H^*(e^{j\hat{\omega}})$, the magnitude-squared of the frequency response. *Your answer should only contain real quantities.*