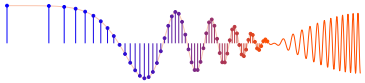

PROBLEM:

A linear time-invariant system is described by the difference equation

$$y[n] = \frac{1}{4}\left(x[n] + x[n-1] + x[n-2] + x[n-3]\right)$$

(a) Find its system function $H(z)$.

(b) Plot the poles and zeros of $H(z)$ in the z-plane.

(c) Find the frequency response $H(e^{j\hat{\omega}})$, express it in polar form (magnitude and phase), and plot the magnitude and phase of $H(e^{j\hat{\omega}})$ as a function of $\hat{\omega}$ for $-\pi < \hat{\omega} < \pi$.

McClellan, Schafer and Yoder, *Signal Processing First*, ISBN 0-13-065562-7.
Prentice Hall, Upper Saddle River, NJ 07458.