PROBLEM:

Consider again the cascade system in Figure 1 with

$$h_1[n] = \delta[n] - \delta[n-1] \quad \text{and} \quad h_2[n] = u[n] - u[n-5].$$

(a) Determine $H_1(\hat{\omega})$, the frequency response of the first system.

(b) Determine $H_2(\hat{\omega})$, the frequency response of the second system.

(c) By convolution, show that $h[n] = h_1[n] * h_2[n] = \delta[n] - \delta[n-5]$ (see part part (c) of Problem 7.5 with $\alpha = 1$). From $h[n]$ determine $H(\hat{\omega})$ the frequency response of the overall system (from $x[n]$ to $y[n]$).

(d) Show that your result in part (c) is the product of the results in parts (a) and (b); i.e., $H_1(\hat{\omega})H_2(\hat{\omega}) = H(\hat{\omega})$.