

**PROBLEM:**

For each of the following frequency responses on the left, pick one of the representations,  $S_1$  through  $S_8$  on the right, that defines *exactly* the same LTI system. Write your answer  $S_1, S_2, S_3, S_4, S_5, S_6, S_7,$  or  $S_8$ , in the box next to each frequency response.

(a)  $1 + e^{j\hat{\omega}}$

$S_1 \quad b_k = \{1, 0, 1\}$

(b)  $2e^{-3j\hat{\omega}}$

$S_2 \quad y[n] = \frac{1}{3} \{x[n] + x[n-1] + x[n-2]\}$

(c)  $\frac{\sin(2\hat{\omega})}{\sin(\hat{\omega}/2)} e^{-3j\hat{\omega}/2}$

$S_3 \quad h[n] = 0.5\delta[n] + 0.5\delta[n-2]$

(d)  $e^{-j\hat{\omega}} \cos(\hat{\omega})$

$S_4 \quad b_k = \{1, 1, 1, 1\}$

$S_5 \quad y[n] = x[n] + x[n-1]$

$S_6 \quad h[n] = \delta[n] - \delta[n-1]$

$S_7 \quad y[n] = x[n] + 2x[n-3]$

$S_8 \quad h[n] = 2\delta[n-3]$