\[ h[n] = \left(\frac{1}{2}\right)^n u[n] \]

**Prob 2.28**

a/ - Causal  Since \( h[n] = 0 \) for \( n < 0 \)

- Stable  Since \( \sum_{n=0}^{\infty} \left(\frac{1}{2}\right)^n = \frac{1}{1 - \frac{1}{2}} = 2 \lt \infty \)

b/ - Not Causal  Since \( h[n] \neq 0 \) for \( n < 0 \)

- Stable  Since \( \sum_{n=-2}^{\infty} (0.8)^n = \frac{1}{1 - 0.8} = 5 \lt \infty \)

\[ h[n] = (0.8)^n u[n+2] \]

c/ - Not Causal  Since \( h[n] \neq 0 \) for \( n < 0 \)

- Unstable  Since \( \sum_{n=-\infty}^{0} (\frac{1}{2})^n = \infty \)

\[ h[n] = \left(\frac{1}{2}\right)^n u[-n] \]

d/ - Not Causal  Since \( h[n] \neq 0 \) for \( n < 0 \)

- Stable  Since \( \sum_{n=-\infty}^{3} 5^n = \sum_{n=3}^{\infty} \left(\frac{1}{5}\right)^n = \left(\frac{1}{5}\right)^3 \sum_{n=0}^{\infty} \left(\frac{1}{5}\right)^n \)

\[ = 5 \cdot \frac{1}{1 - \frac{1}{5}} = 5 \cdot \frac{5}{4} = \frac{25}{4} < \infty \]

\[ = 5 \cdot \frac{1}{1 - \frac{1}{5}} \]

e/ - Causal  Since \( h[n] = 0 \) for \( n < 0 \)

- Unstable  Because \( \sum_{n=1}^{\infty} (1.01)^n = \infty \)

\[ h[n] = \left(-\frac{1}{2}\right)^n u[n] + (1.01)^n u[n-1] \]

f/ - Not Causal  Since \( h[n] \neq 0 \) for \( n < 0 \)

- Stable  Since \( \sum_{n=-\infty}^{\infty} |h[n]| = 3.65 \lt \infty \)

\[ h[n] = \left(-\frac{1}{2}\right)^n u[n] + (1.01)^n u[-1-n] \]

g/ - Causal  Since \( h[n] = 0 \) for \( n < 0 \)

- Stable  Since \( \sum_{n=1}^{\infty} h[n] = 1 \lt \infty \)

\[ h[n] = n \left(\frac{1}{3}\right)^n u[n-1] \]