**Example 6-2:** Consider the complex input $x[n] = 2e^{j\pi/4}e^{j(\pi/3)n}$ whose frequency is $\hat{\omega} = \pi/3$. If this signal is the input to the system of Example 6-1, then we must evaluate the frequency response at the input frequency in order to use the frequency-domain method defined in (**??**). The evaluation gives: $|H(e^{j\pi/3})| = 2 + 2\cos(\pi/3) = 3$ and $\angle H(e^{j\pi/3}) = -\pi/3$. Therefore, the output of the system for the given input is

$$
\begin{aligned}
y[n] &= 3e^{-j\pi/3} \cdot 2e^{j\pi/4}e^{j\pi n/3} \\
&= (3 \cdot 2) \cdot e^{(j\pi/4 - j\pi/3)}e^{j\pi n/3} \\
&= 6e^{-j\pi/12}e^{j\pi n/3} = 6e^{j\pi/4}e^{j\pi(n-1)/3}
\end{aligned}
$$

Thus, for this system and the given input $x[n]$, the output is equal to the input multiplied by 3, and the phase shift of $-\pi/3$ corresponds to a delay of one sample.

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