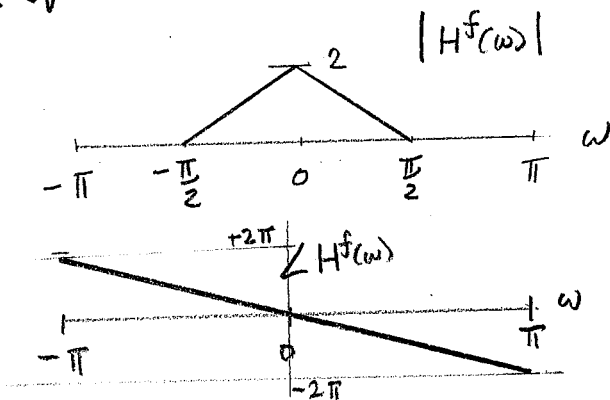① LTI system: $y(n) = 3x(n) + 3x(n-1)$

a) write the freq. resp. of the system, $H^f(\omega)$

b) find the output produced by $x(n) = 2\cos(0.5\pi n)$

② The freq. resp. of an LTI system is:

Find output $y(n)$ produced by input signal $x(n) = 2 + 3\cos(0.2\pi n) + 4\cos(0.5\pi n) + (-1)^n$.

③ The freq. resp. of an LTI system is given as

$$H^f(\omega) = \begin{cases} e^{-j2\omega} & |\omega| \leq 0.5\pi \\ 0.5\,e^{-j\omega} & 0.5\pi < |\omega| < \pi \end{cases}$$

Sketch $|H^f(\omega)|$ and $\angle H^f(\omega)$, — the magnitude & phase of the freq. resp.

④ match the input-system-output on next page

⑤ Impulse response of LTI system: $h(n) = \cos\left(\frac{\pi}{3}n + \frac{\pi}{2}\right)u(n)$

Find the difference equation to implement the system.

Each of the two discrete-time signals below are processed with each of two LTI systems. The frequency response magnitude $|H^f(\omega)|$ are shown below. Indicate how each of the four output signals are produced by completing the table below.
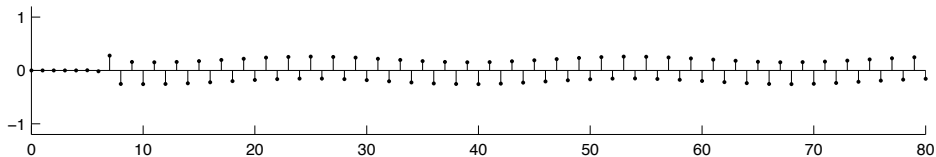
Input signal 1 is given by: $\cos(0.9\,\pi\,n)\,u(n-4)$

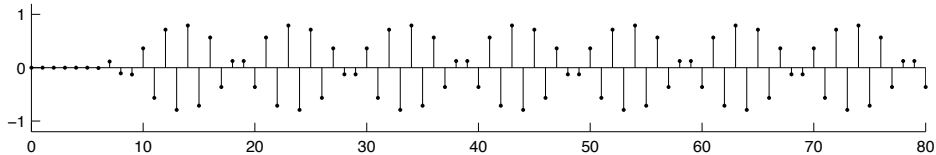Input signal 2 is given by: $0.75\,\cos(0.07\,\pi\,n)\,u(n-4) + 0.25\,(-1)^n\,u(n-4)$

Input Signal	System	Output Signal
1	1	
1	2	
2	1	
2	2	

INPUT SIGNAL 1

INPUT SIGNAL 2
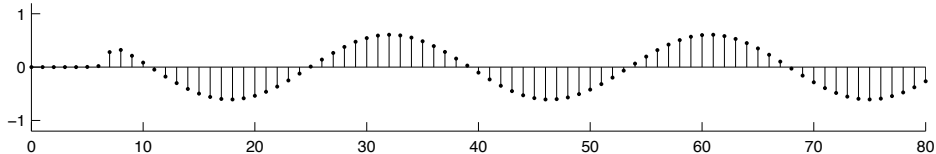

SYSTEM 1 FREQUENCY RESPONSE

SYSTEM 2 FREQUENCY RESPONSE
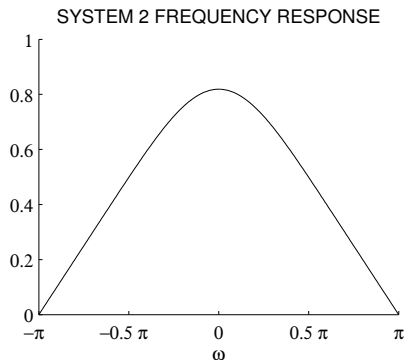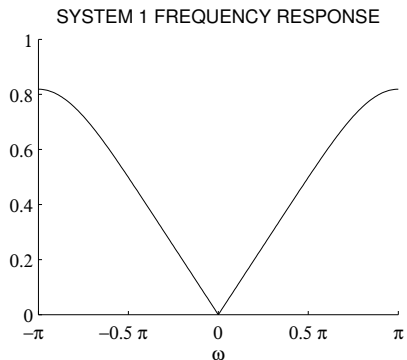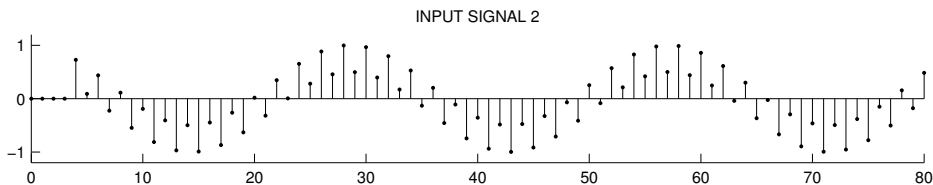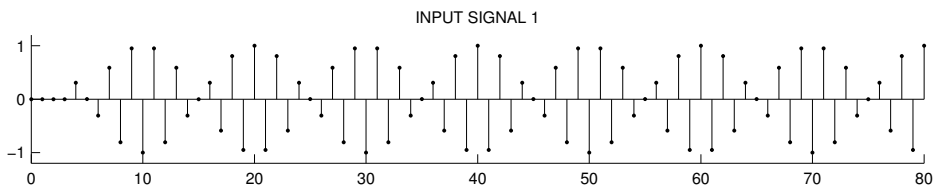
OUTPUT SIGNAL 1

OUTPUT SIGNAL 2

OUTPUT SIGNAL 3

OUTPUT SIGNAL 4