

PROBLEM:

For a particular LTI system, when the input is the *unit step* signal:

$$x_1[n] = u[n] = \begin{cases} 1 & n \geq 0 \\ 0 & n < 0 \end{cases}$$

the corresponding output is

$$y_1[n] = \delta[n] + 2\delta[n - 1] - \delta[n - 2] = \begin{cases} 0 & n < 0 \\ 1 & n = 0 \\ 2 & n = 1 \\ -1 & n = 2 \\ 0 & n \geq 3 \end{cases}$$

Determine the output when the input to the LTI system is $x_2[n] = 3u[n] - 2u[n - 4]$. Give your answer as a formula expressing $y_2[n]$ in terms of known sequences, or give a list of values for $-\infty < n < \infty$.