UNIVERSITY OF CALIFORNIA, RIVERSIDE
Department of Electrical Engineering

WINTER 2025

EE110B-SIGNALS AND SYSTEMS

HOMEWORK 2

Please turn in before Friday, January 24th, 2025, 11:59PM.

Problem 1: Consider an LTI system with the input $x[n] = u[n-3]$ and the impulse response $h[n] = 0.8^n u[n-2]$. Determine and plot the output $y[n]$ of the system.

Problem 2: Let an LTI system have the impulse response

$$h[n] = 2^{-n} u[n] \, .$$

Determine whether this system is memoryless, causal, stable, and invertible.

Problem 3: Impulse responses of LTI systems can be physically found by inputting $x[n] = \delta[n]$ to the system and measuring the output (the output would be precisely the impulse response). Assume that during the process, we inadvertently input

$$x[n] = \delta[n] + \delta[n-1]$$

instead, and observed the output to be $y[n] = u[n]$. Can we still figure out the impulse response, and if so, what is it?