University of California Riverside, Department of ECE
EE110A: Signals and Systems
Prof. Vishwanath Saragadam Winter 2025

Homework 4

This homework is due on **Thursday**, February 6th, 11:59PM.

Instructions: Please upload the homework by 11:59 PM (Pacific Time) on Canvas on the day of the deadline. If you are unable to upload it on Canvas, please hand over the homework to the TA (Xunyu Li) between 2:00 PM and 3:00 PM (Pacific Time) during TA office hours.

Problem 1 [10pts]: Consider the **causal LTI** system whose input-output relation is given by

$$y(t) + \frac{dy(t)}{dt} = x(t) \ .$$

a) Determine the impulse response of the system, $h(t)$.

b) Now determine the output of the system to the input $x(t) = e^{-3t}u(t)$ using convolution with $h(t)$ you determined in the first part. How does it compare to the answer you obtained in your previous homework?

Problem 2 [10pts]: Draw block diagram representations for causal LTI systems described by the following differential equations:

a) $y(t) + \frac{1}{2}\frac{dy(t)}{dt} = 4x(t)$

b) $25y(t) - 6\frac{dy(t)}{dt} + \frac{d^2y(t)}{dt^2} = x(t) - \frac{dx(t)}{dt}$