

Homework 6

(Total 150 pts)

Due 5:00 pm on December 5, 2024 (Thursday)

1. (10 pts) Problem 7-2.2 (pp. 315).
2. (30 pts) Problem 7-6.3 (pp. 319).
3. (40 pts) Problem 7-8.1 (pp 320).
4. (20 pts) Exercise 8-3.2 (pp 330)
5. (50 pts)

A linear system has an impulse response of $h(t) = \begin{cases} 1 & 0 \leq t \leq 0.5 \\ 0 & \text{elsewhere} \end{cases}$. The input signal to

this system is a white noise $X(t)$ with a two-sided spectral density of $10 \text{ V}^2/\text{Hz}$. Determine the autocorrelation function of the output $Y(t)$ and sketch the waveform of $R_Y(\tau)$. Show your derivations and simplify the final result as much as possible.