ECE250: Signals & Systems

Assignment 1: Report

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Assumptions:

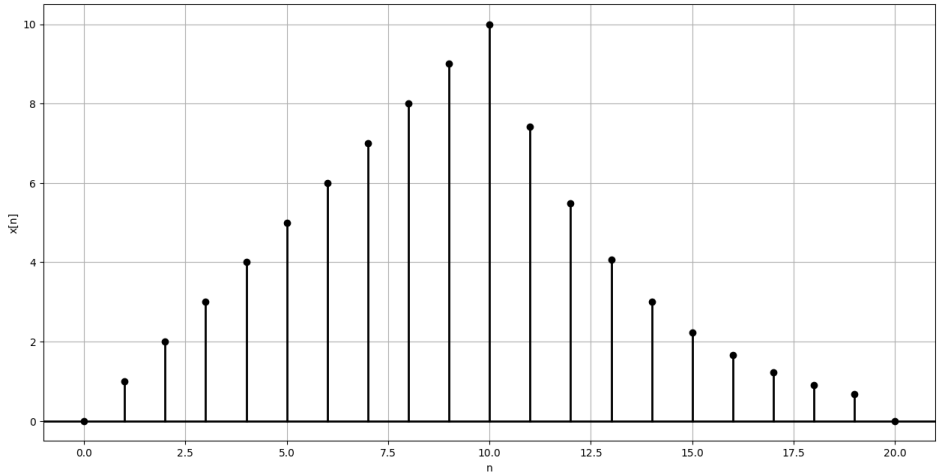
1. The signal $u[n]$ is the unit-step signal, defined below:

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

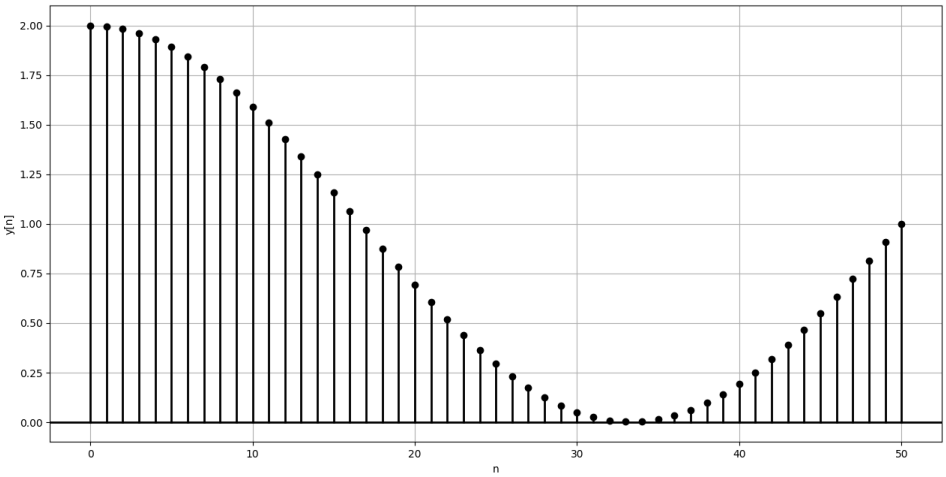
2. $p[q[n]]$ means scaling the signal $q[n]$ by p, when $p \in \mathbb{R}$.

Question: 5

1. $x[n] = n[u[n] - u[n-10]] + 10e^{-0.3(n-10)}[u[n-10] - u[n-20]],\ 0 \leq n \leq 20$



2. $y[n] = \cos[0.03\pi n] + u[n],\ 0 \leq n \leq 50$

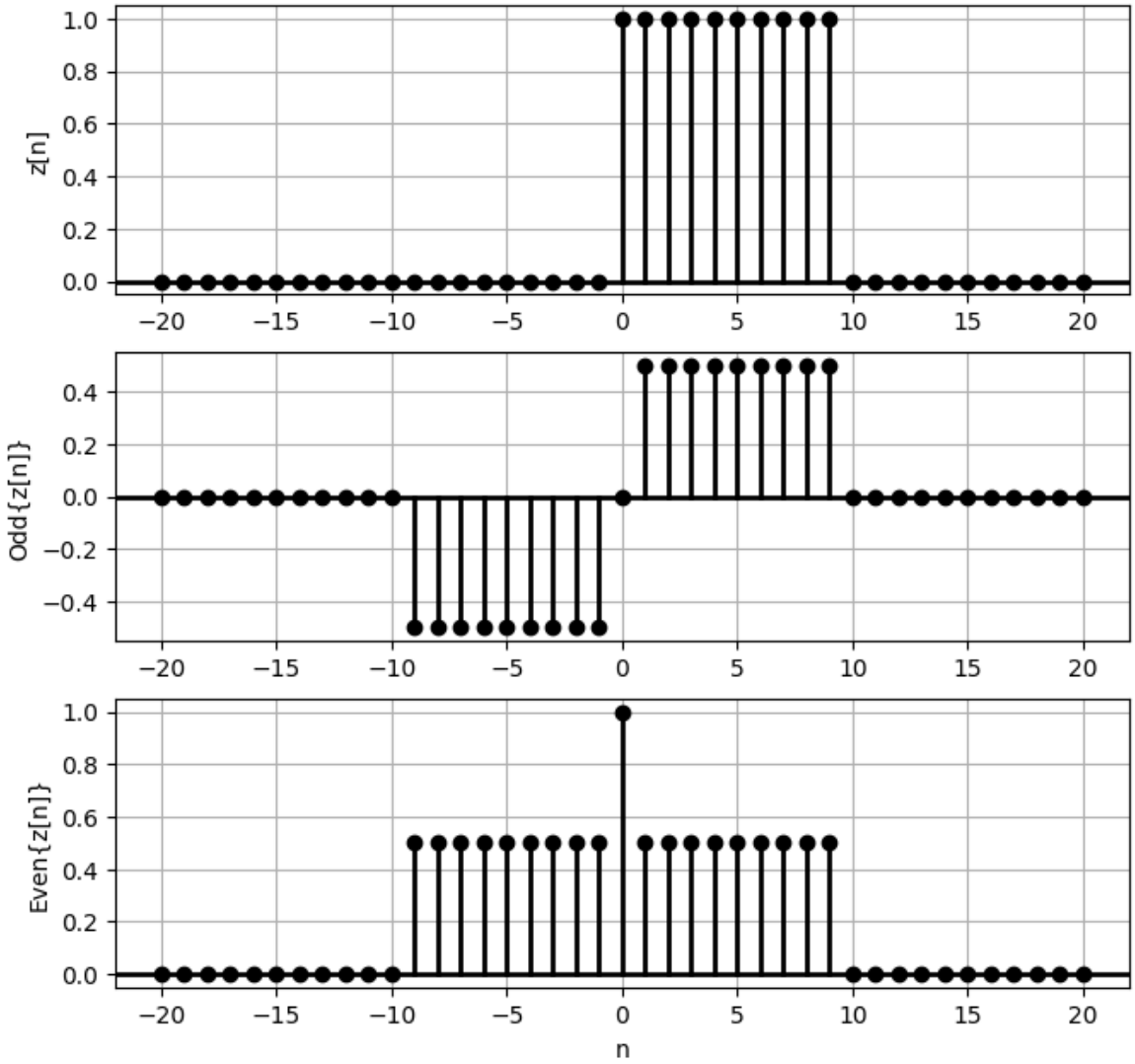


Question: 6

Given signal: $z[n] = u[n] - u[n-10]$

$$\text{Even}\{z[n]\} = \frac{z[n] + z[-n]}{2} \tag{2}$$

$$\text{Odd}\{z[n]\} = \frac{z[n] - z[-n]}{2} \tag{3}$$



Subplots for **Question: 6**

Some inferences:

1. The even part of $z[n]$ is symmetric about the x-axis, $y = 0$.
2. The odd part of $z[n]$ is symmetric about the line $y = x$.
3. It is also (visually) clear that $z[n] = \text{Odd}\{x[n]\} + \text{Even}\{x[n]\}$.