Assignment -1
Signals & Systems: ECE250
Monsoon-2023

Release: 18-Aug-2023 (4:00 PM) **Submission: 27-Aug-2023 (4:00 PM)**

Instructions

- **Institute Plagiarism Policy Applicable.** This will be subjected to strict plagiarism check.
- This assignment should be attempted individually.
- A maximum point for this assignment is **68**. All questions are compulsory.
- **Theory Problems:** Only a *.pdf* file are acceptable, which you have to submit on Google Classroom. Use A4 size sheets only (ruled or blank) to solve your assignment and scan it to create a *.pdf* file. Attempt each question on a different sheet. Do not start a new question at the back of the previous one. Do not forget to mention Page Number (bottom canter) clearly on each sheet of the assignment. Submit a *.pdf* file named *A1_ RollNo.pdf* (e.g., *A1_PhD22100.pdf*), which containing the quality scan copy of your solved assignment.
- **Programming Problems:** Use Matlab to solve the programming problems. For your solutions, you need to submit a zipped file on Google classroom with the following:– program files (.m) with all dependencies.– a report (.pdf) with your coding outputs and generated plots. The report should be self-complete with all your assumptions and inferences clearly specified. Submit a *.zip* file named *A1_ RollNo.zip* (e.g., *A1_PhD22100.zip*). Codes/reports submitted without a zipped file or without following the naming convention will NOT be checked.
- **Submission Policy:** Turn-in your submission as early as possible to avoid late submissions. In case of multiple submissions, the latest submission will be evaluated. Expect **No Extensions**. Late submissions will not be evaluated and hence will be awarded zero marks strictly.
- **Clarifications:** Symbols have their usual meaning. Assume the missing information & mention it in the report. Use Google Classroom for any queries. In order to keep it fair for all, no email queries will be entertained.
- There could be multiple ways to approach a question. Please justify your answers. Questions without justification will get zero marks.

[CO1] Q1: If x[n] = {1, 2, 3, 4, 5} then find the value of y[n] in the following cases, where arrow represent n=0. **[4*2 Points]**

(a) y[n] = x[-2n]

(b) y[n] = x[-n+1]

(c) y[n] = x[2n/3]

(d) y[n] = x[2n-1]

[CO1] Q2: Draw signal x[n] or x(t) in the following cases , where u[n] or u(t) = unit step signal, r(t) = ramp signal & (*) symbol is used for multiplication. **[4*5 Points]**

(a) x[n] = u[-n-2]*u[n+3]

(b) x(t) = 2t*[u(t) – u(t-1)]

(c) x(t) = 3u(t+2) + 2u(t) -9u(t-2)

(d) x(t) = [-2r(t+2) + 2r(t) -4r(t-2) +4r(t-3) +8u(t-3) + 8r(t-4) -8r(t-5) -12u(t-7)]

[CO1] Q3: Find Fundamental Time Period (FTP) of signal x(t) or x[n] in the following cases- **[4*2 Points]**

(a) $x(t) = 8\sin(4\pi t) + 7\cos(7\pi t)$

(b) $x(t) = 26\sin(2\pi t) + 15\cos(3t)$

(c) $x[n] = \sin(\sqrt{3}*\pi n)$

(d) $x[n] = \cos(4\pi n/7) + \sin(5\pi n/9)$

[CO1] Q4: Find energy of the following signals, where arrow represent n=0 - **[4*3 Points]**

(a) x[n] = {1+j, 1-j, -1, 2}
↑

(b) $x[n] = (1/3)^n u[n]$

(c) $x[n] = 3^{(-2n-3j)} u[n]$

(d) $x(t) = e^{-a|t|}$, a>0

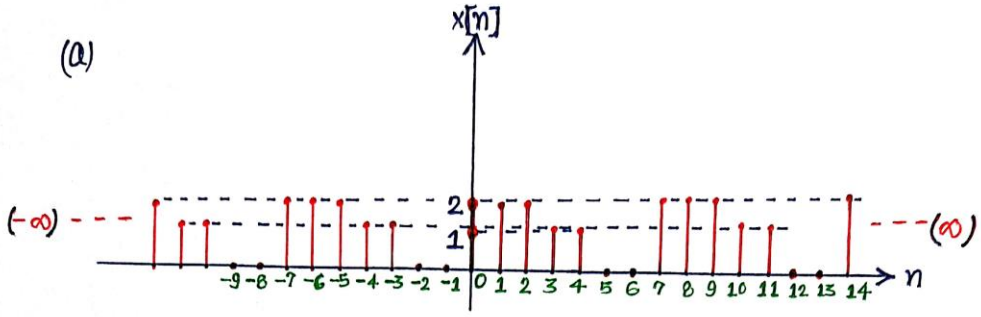
[CO2] Q5: Comment about Time Invariant & Time Variant System of the following systems- **[2*2 Points]**

(a) y(t) = x(t) for t<0 & y(t) = x(t-1) for t≥0

(b) y(t) = x(t) + x(t-1)

[CO1] Q6: Find power of the following signals- **[2*3 Points]**

(a)



(b)