DA-IICT, CT 303, Autumn 2024-2025
Lab Exercise 5 and Tutorial
Date: 10/09/2024, Expected by: 24/10/2024
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References for perusal:

[1] *Contemporary Communication Systems Using MATLAB*, John G. Proakis, and Masoud Salehi, 2013, Cengage learning.

- ***This sheet needs to be solved during the current and the next lab sessions.***
- In the exercise sheet, there are 2 lab problems and 1 tutorial problem.
- Both the lab problems are to be done in MATLAB.
- The coding in MATLAB should be done in groups of 2.
- All the required soft copies of the texts referred to in the exercises are available in the lecture folder of the instructor for section A.

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1. **(Tutorial Exercise)** Design a TDM system that will accomodate two 2,400-bit/s synchronous digital inputs and an analog input that has a bandwidth of 2,700 Hz. Assume that the analog input is sampled at 1.11111 times the Nyquis rate and converted into 4-bit PCM words. Draw a block diagram for your design, and indicate the data rate at various points on your diagram. Explain how your TDM scheme works.
2. Go through sections 6.1 and 6.2 from [1]. After understanding the power spectrum calculation for a digital PAM signal, solve illustrative problems 6.1 and 6.2. Thereafter, reproduce the MATLAB script for both the problems.
3. As a followup of the above problem, solve problems 6.1, 6.2 and 6.3 at the end of chapter 6 in [1].

Instructions for Preparing Lab Report:

- For MATLAB based experiments, your lab report must contain the code and all the figures. Further, you need to explain the results in the graphs.
- For tutorial problems, you need to put up the solution in the lab report.

General Instructions:

- The lab is intentionally made from the references given above so that you have ample resources to refer to and learn.
- For the final evaluation, we may have a quiz/lab test which will test if you have gone through the codes and tweaked them in Matlab.
- For learning Matlab functions used in the codes, refer to the help section which pops up as you press F1 in Matlab.