EE 220 : Signals and Systems

Department of Electronics and Electrical Engineerng
Indian Institute of Technology, Guwahati
Monsoon 2023

Assignment 1
Sharing of assignment is not permitted. Copied assignments will attract zero marks. Individual assignments to be submitted in the tutorial class on 11th October. This assignment will be graded for 6% marks. Solving in neat handwriting is a must.

Question 1 [4 marks]

[a]. A function is expressed in its Fourier series representation as:

$$f(t) = \sum_{k=1}^{\infty} \frac{\sin kt}{k}$$

Guess a closed-form expression for the function $f(t)$ by plotting it in the time domain. Provide all details of your process. Any computer programs and outputs can be submitted as print-outs.

Hint: Assume K = 1:50. Plot the Fourier series for these first 50 terms. You will be able to guess the closed-form expression after looking at the periodic plot of $f(t)$.

[b] Show that the closed-form expression that you have guessed does have the Fourier series as already expressed in part [a]. Why are there no cosine terms?

Question 2 [2 marks]

Go through the topic 18 as a homework reading for the upcoming tutorial. Understand the example 1.2.1 and explain all the details in your own words [including part 1 to part 4]. In doing so:

- List all the questions that arise in your mind while solving this example.
- Obtain the conclusion listed in table 3.3 by yourself.
- Provide your complete worksheet in neat handwriting.