Experiment 2

Relationship between DFT and DTFT

Laboratory Tasks

To verify that the Discrete Fourier Transform (DFT) is the sampled version of the DTFT in the frequency domain.

Description

In this lab, you will perform the following tasks:

1. Consider the following rectangular pulse in MATLAB

   $$u[n] = [1,1,1,1,1] \text{ where } n = [0,1,2,3,4]$$

   Find its Discrete Fourier Transform (DFT) by

   $$U(k) = \sum_{n=0}^{n=N-1} u[n]\, e^{-j\frac{2\pi}{N}kn}$$

   Here N is any length greater than or equal to $N = 5$. Choose $N = 5$ and plot phase and amplitude of $U(k)$ with respect to ω_k , where k goes from $0\ to\ 4$.

2. Compare the above DFT with the DTFT of the same signal.
3. Now choose $N = your\ roll\ number$ and again find DFT. Compare this DFT with previous DFT and DTFT of part-1.

Laboratory Rubrics

Performance	Exceeds expectation (3)/(1)	Meets expectation (1.5)/(0.5)	Does not meet expectation (0)/(0)	Marks S1
K: Knowledge of required functions for code design. Marks: 1				
D: Design of Code Marks: 3				
S: Show proper results. Marks: 1				

Good ingenious programming or problem solving skills during lab work will be rewarded with additional bonus marks.