

# EE2801: DSP Lab

## Jan-Apr 2023

### Assignment-1: Part one

#### Problems:

- 1) Determine the Fourier transform of an analog step function  $s(t)=u(t)$  of duration  $T$  seconds to obtain  $S(F)$ . Assume  $T=1$ .
- 2) Sample the above signal using a suitable sampling ratesay  $q/T$  where  $q$  is a suitably chosen integer to obtain a discrete time signal  $s(n)$ .
- 3) Determine the Fourier Transform of the above digital signal  $s(n)$  to obtain  $S(f)$ . Analyse the effect of aliasing.

#### Instructions:

- For '1)' write the solution in pen and paper.
- For '2)' Simulate the sampled signal in Matlab and plot it. Also, mention the sampling frequency which you have choosen in code file as comments.
- For '3)' Write your own code to find DTFT of  $s[n]$  and plot magnitude response. Also, verify the output of your DTFT code with in built 'fft' function of Matlab. Write your observation in MS word about aliasing effect.
- Submit a Zip file named 'Roll\_No.zip' for example EE21BTECH11001.zip which contains
  1. Scaned pdf of your solution for '1)'.
  2. Matlab code (.m file)
  3. Plot for  $s[n]$  and magnitude response( $|S(f)|$ ) of DTFT of  $s[n]$ .
  4. Pdf of your observation word file.