

# Birla Institute of Technology & Science, Pilani, Rajasthan

First Semester 2020-2021

## Lab-4: Signal BW

Course: EEE F311 Communication Systems  
Instructor-in-Charge: S M Zafaruddin

Date: 08-09-2020

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### Instructions

for i= 1:2

- Please do not take help from Internet or any other sources. It will more confuse you rather than serve the purpose of learning. If you have any iota of question, do not hesitate to ask. I guarantee that in few weeks you can code anything if you do as per instructions.
- Create a folder Lab4 in Lab sub-folder of your shared Dropbox folder.
- The whole task should be completed before 3:50PM. You are evaluated based on your approach/effort rather than CORRECTNESS !
- You can start the tasks in any order.
- You need to submit .m file, and corresponding .jpg file for each task or even a part of the task. Use the file request link for your Lab section. Ask the TAs to share the link if you do not have. The link is available in the google meet invitation for respective lab sections.
- As I said earlier, please do not wait for all tasks to be completed. Once you get even a part completed, send it.
- You can also send the code with your queries/feedback. Name it like ver1, and write the question as a comment. Inform your TAs (or me) about the question using the DM slack. Using the feedback, improve the code and submit as ver2 if you still have problem and so on.
- At 3:50 PM, compile all plots/results/observations/conclusions in a word doc and upload to the link. [Also paste the final codes in the word doc. You can also convert word to pdf and submit.](#)  
**end**
- Best of Luck

# Objectives

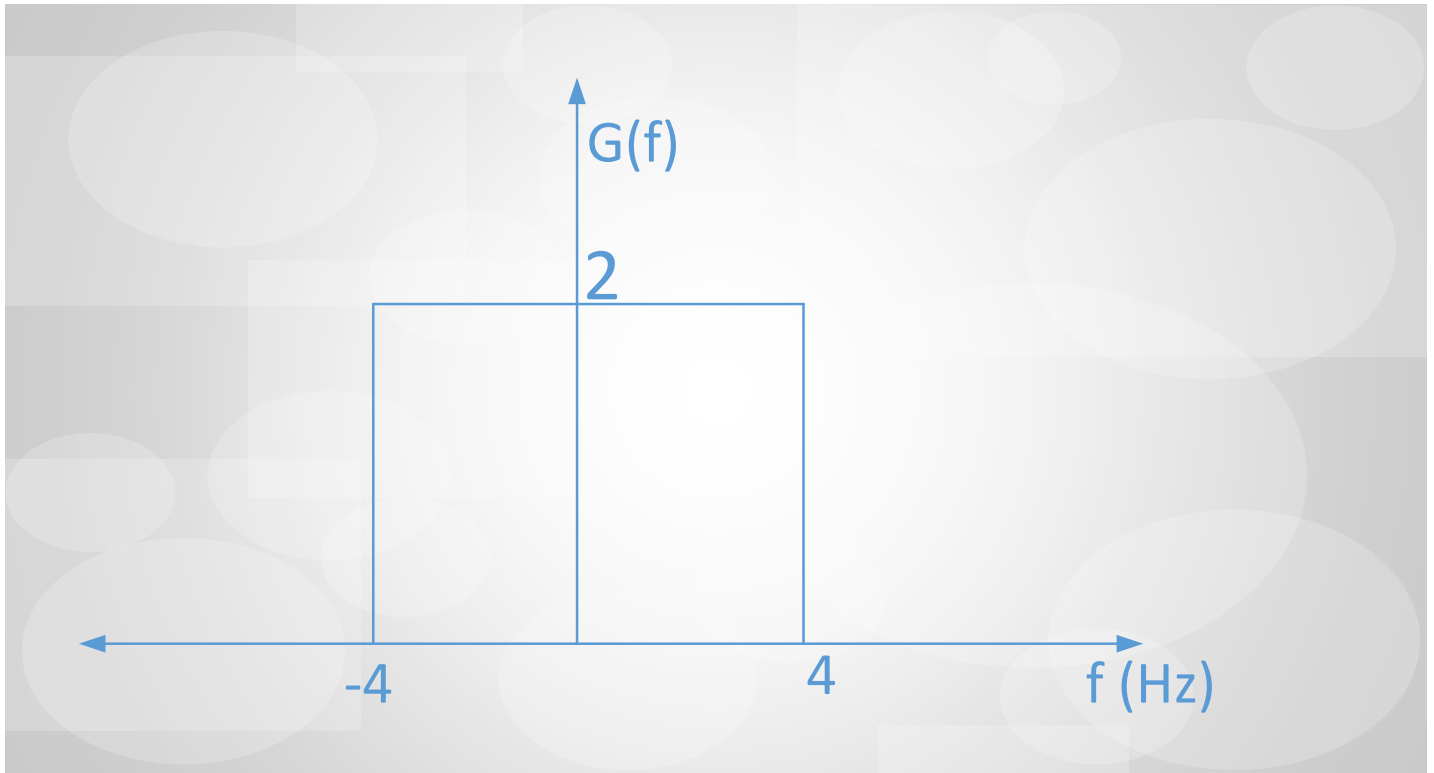
In this task, the objective is to study various types of band-limited signals and systems.

## Task 1

Digital messages are generally represented as rectangular pulses. Generate symmetrical rectangular pulse (use Matlab function `rect` or any other) of positive width  $T = 4$ ,  $T = 8$ , and  $T = 20$  seconds in time domain. Use amplitude 1. Also generate the magnitude of frequency response of these rectangular pulses. Plot the time domain and frequency responses for all three time-widths. Use subplot 1 for the time domain and subplot 2 for the frequency domain. Comment on the effect of increasing the time width on the frequency content of the signal.

## Task 2

Generate a band-limited system whose frequency response is as shown in the figure. Plot the impulse response  $g(t)$  i.e. in the time-domain. Then pass the rectangular pulse generated in task 1 for  $T = 8$  through the impulse response  $g(t)$ . Use Matlab function `conv`. Plot the time domain and frequency domain responses of the signal at the output.



## Project Task

We have started individual tasks with a bigger picture: to design an end-to-end simulator for a digital communication system. In this task, we have generated band-limited signals and systems.