**Lab Report No 5**



**Digital Signal Processing**

**Submitted By**: Hassan Zaib Jadoon

**Registration No**: 22PWCSE2144

**Section: A**

“On my honor, as student of University of Engineering and Technology, I have neither given nor received unauthorized assistance on this academic work”

**Student Signature: \_\_\_\_\_\_\_\_\_\_\_**

**Department of Computer Systems Engineering**

**University of Engineering and Technology Peshawar**

**CSE 402L: Digital Signal Processing**

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| --- | --- | --- | --- | --- |
| **Demonstration of Concepts** | **Poor (Does not meet expectation (1))**  The student failed to demonstrate a clear understanding of the assignment concepts | **Fair (Meet Expectation (2-3))**  The student demonstrated a clear understanding of some of the assignment concepts | **Good (Exceeds Expectation (4-5)**  The student demonstrated a clear understanding of the assignment concepts | **Score**  **30%** |
| **Accuracy** | The student completed ( <50%) tasks and provided MATLAB code and/or Simulink models with errors. Outputs shown are not correct in form of graphs (no labels) and/or tables along with incorrect analysis or remarks. | The student completed partial tasks (50% - <90%) with accurate MATLAB code and/or Simulink models. Correct outputs are shown in form of graphs (without labels) and/or tables along with correct analysis or remarks. | The student completed all required tasks (90%-100%) with accurate MATLAB code and/or Simulink models. Correct outputs are shown in form of labeled graphs and/or tables along with correct analysis or remarks. | **30%** |
| **Following Directions** | The student clearly failed to follow the verbal and written instructions to successfully complete the lab | The student failed to follow the some of the verbal and written instructions to successfully complete all requirements of the lab | The student followed the verbal and written instructions to successfully complete requirements of the lab | **20%** |
| **Time Utilization** | The student failed to complete even part of the lab in the allotted amount of time | The student failed to complete the entire lab in the allotted amount of time | The student completed the lab in its entirety in the allotted amount of time | **20%** |

**LAB NO: 5 . ANALYSIS OF AMPLITUDE MODULATED AND DEMODULATED SIGNAL USING MATLAB**

Provide .m file with detailed comments

**Tasks:**

1. **Define Amplitude Modulation:**

Amplitude Modulation is the process of varying the amplitude of a carrier signal proportional to the modulating signal while maintaining the carrier’s frequency constant.

1. **Define Amplitude Demodulation:**

**Amplitude Demodulation** is the process of extracting the original message signal from an amplitude-modulated (AM) carrier signal.

1. **List three reasons, why we implement Amplitude Modulation in Communication Systems:**

* Efficient Transmission of Signals Over Long Distances
* Smaller Antenna Size
* Maximum Bandwidth utilization

1. **Define Modulation Index:**

Modulation index is defined as the ratio of the peak amplitude of the message signal to the peak amplitude of the carrier signal.

1. Input Modulation Index from 0 to 1.4, the increment step should be 0.2. Observe/analyze and comment about the output observed.

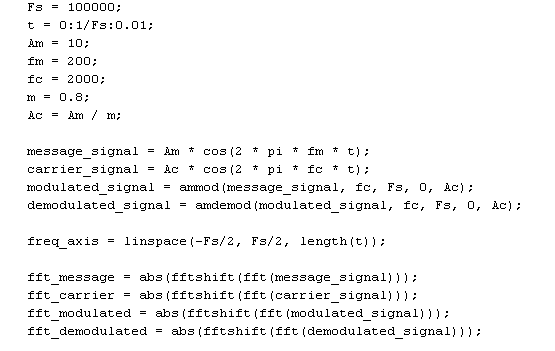
**Procedure:**

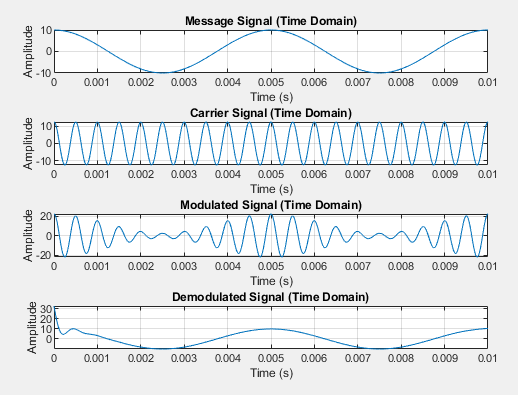
* Create and plot (both time and frequency domain) a message signal with amplitude 10 and frequency 200 Hz
* Create and plot (both time and frequency domain) a Carrier signal with amplitude 10/Modulation Index and frequency 2000 Hz
* Modulate the message signal with the carrier using the desired Modulation Index. Plot modulated signal in both time and frequency domain. Observe/Analyze the output.

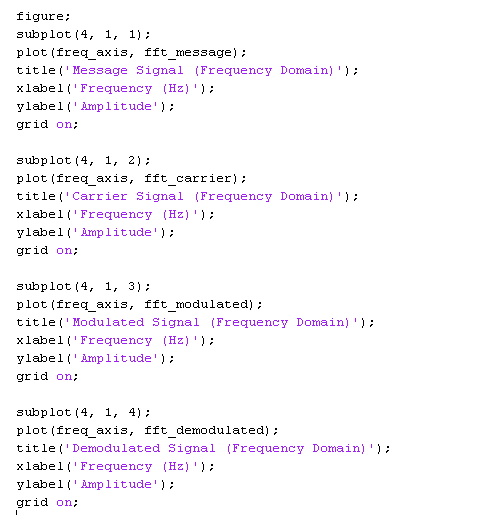
Hint: y = ammod(ym, fc, 100000, 0, Ac);

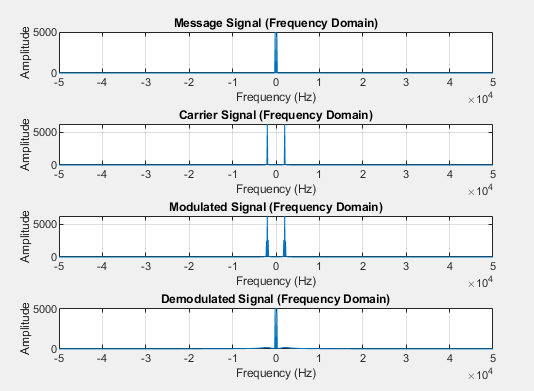
* Demodulate the Modulated signal . Observe/Analyze the output.

**Hint:** z = amdemod(y, fc, 100000, 0, Ac);

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