Faculty of Engineering and Technology

Electrical and Computer Engineering Department

ENEE4113

Communications Lab

PreLab No.1

Normal Amplitude Modulation and Demodulation

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Section: 5.

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Block Simulation (using Matlab Simulink):

- ## Normal Amplitude Modulation

Firstly, the block diagram of the amplitude modulation using Simulink was built as shown in the following figure:

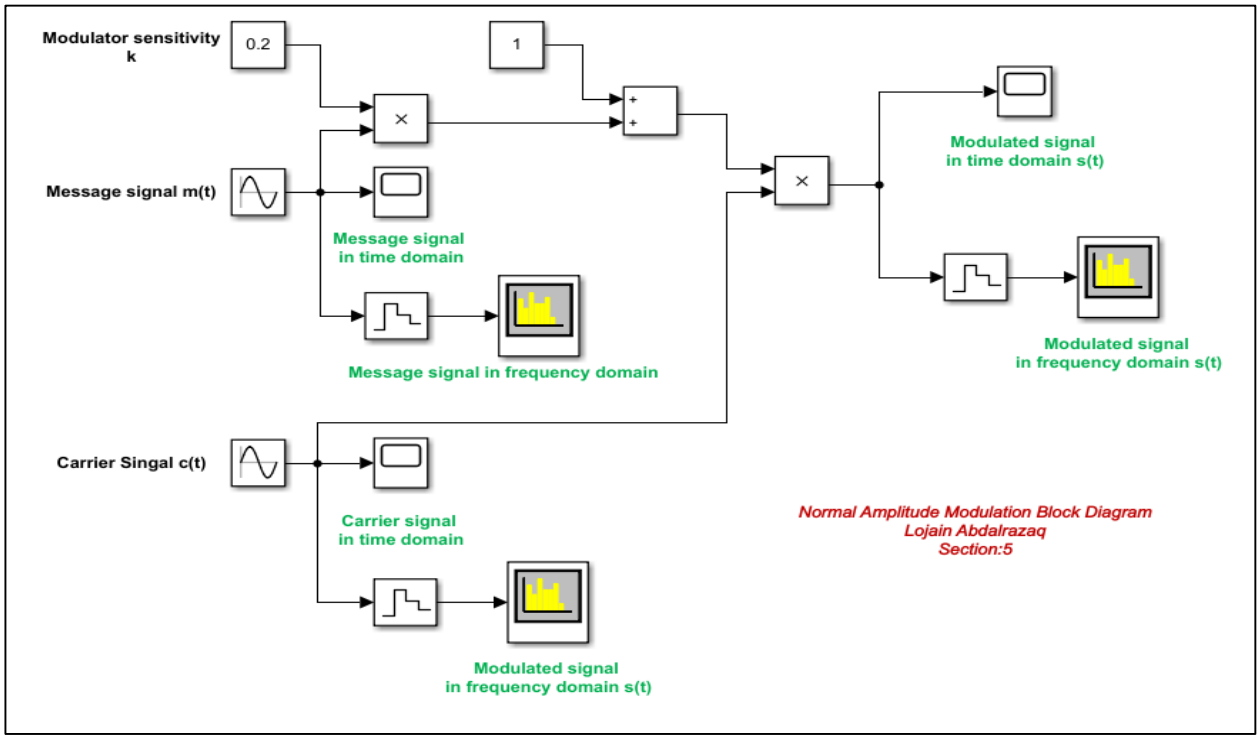

Figure 1 Normal Amplitude Modulation Block Diagram using Simulink.

The input message signal m(t) in time and frequency domain:

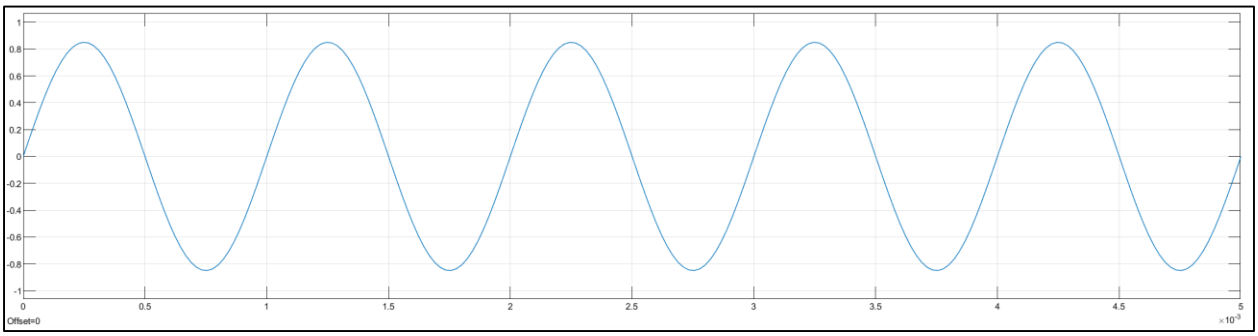

Figure 2 Input message signal m(t) in time domain.

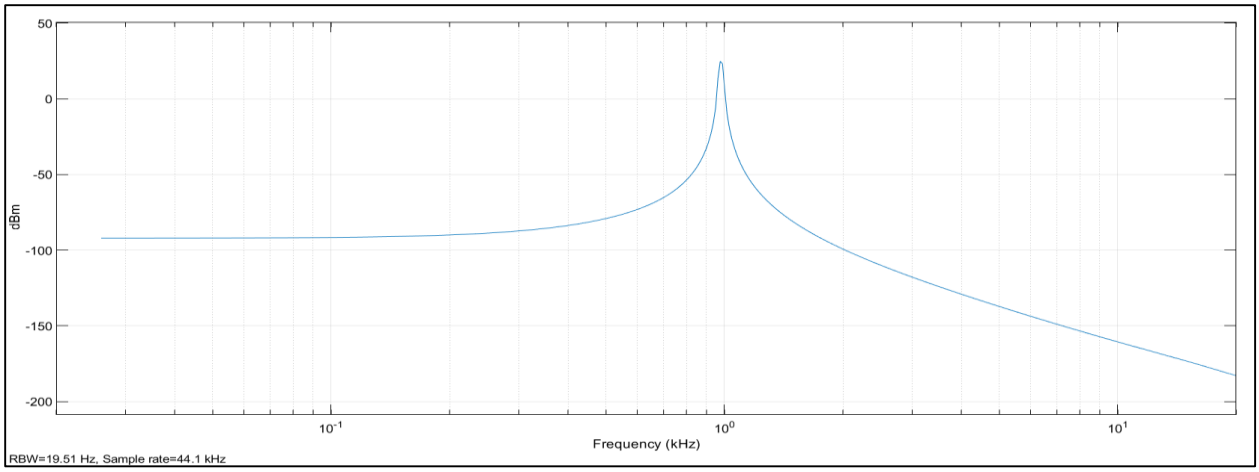

Figure 3 Input message signal m(t) in frequency domain.

While the carrier signal c(t) in time and frequency domain as the following:

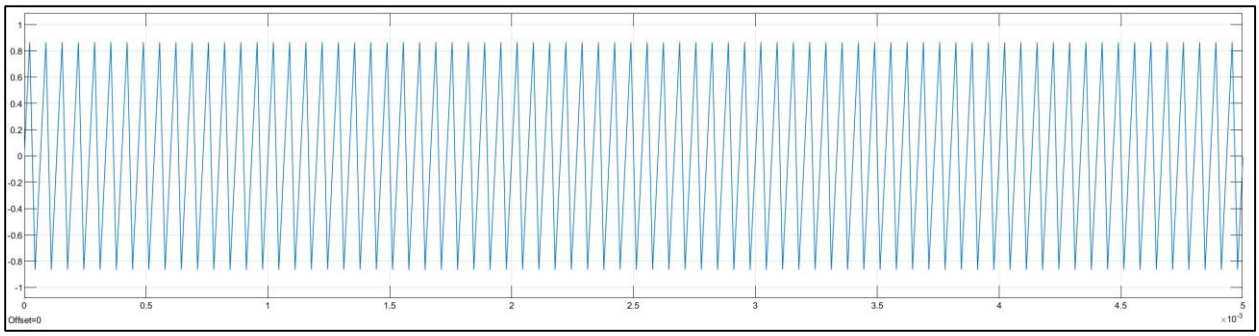

Figure 5 Input carrier signal c(t) in time domain..

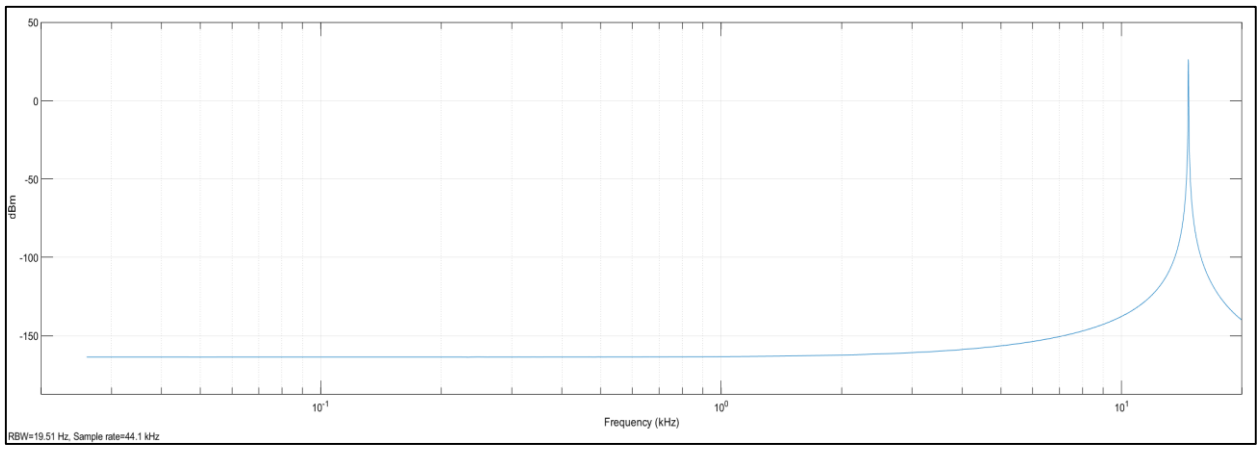

Figure 4 Input carrier signal c(t) in frequency domain.

✓ ***When Modulation index < 1(M=0.2):***

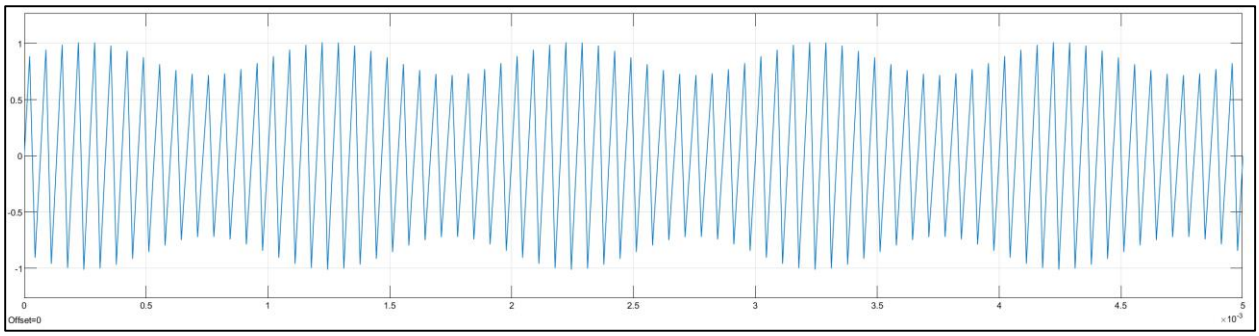

Figure 6 Modulated signal when s(t) when M=0.2 in time domain.

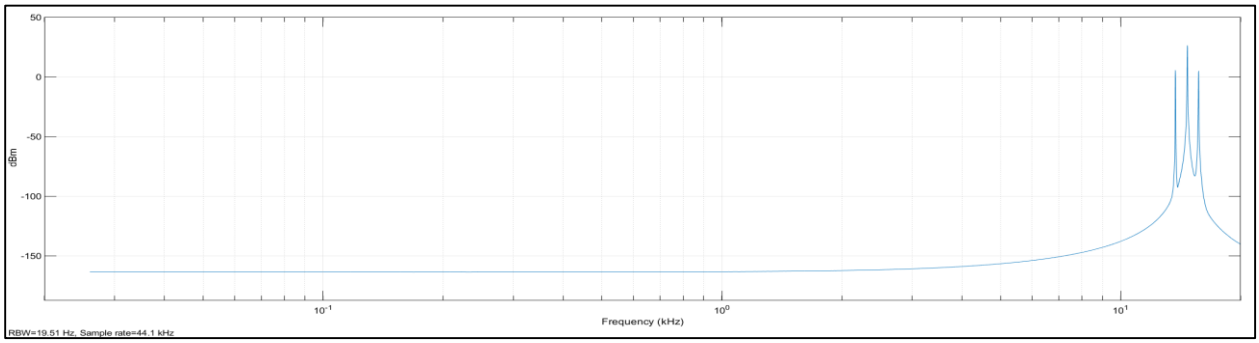

Figure 7 Modulated signal s(t) when M=0.2 in frequency domain.

✓ ***When Modulation index = 1(M=1):***

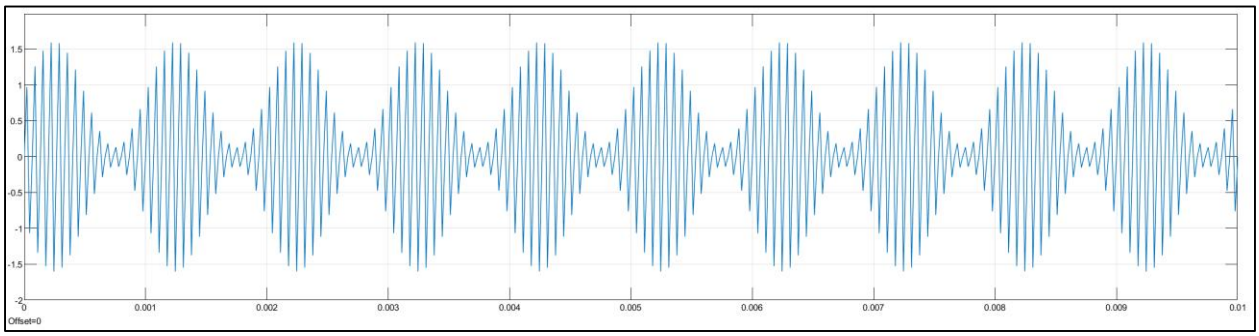

Figure 9 Modulated signal s(t) when M=1 in time domain.

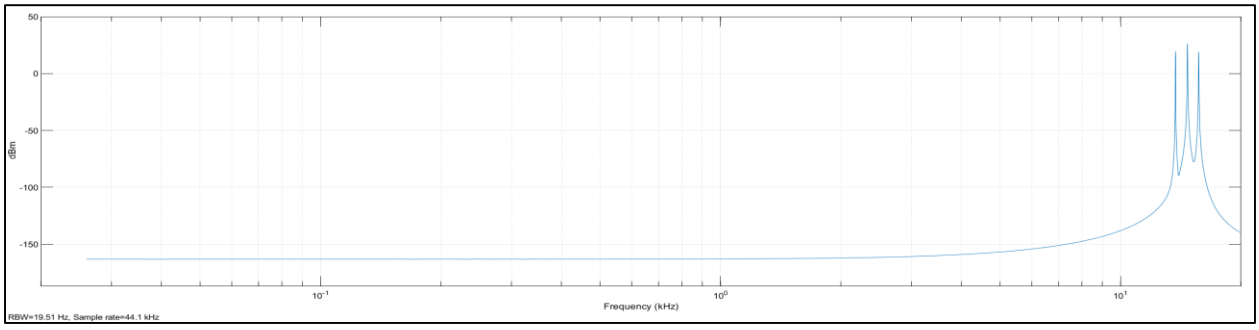

Figure 8 Modulated signal s(t) when M=1 in frequency domain.

✓ ***When Modulation index > 1(M=3):***

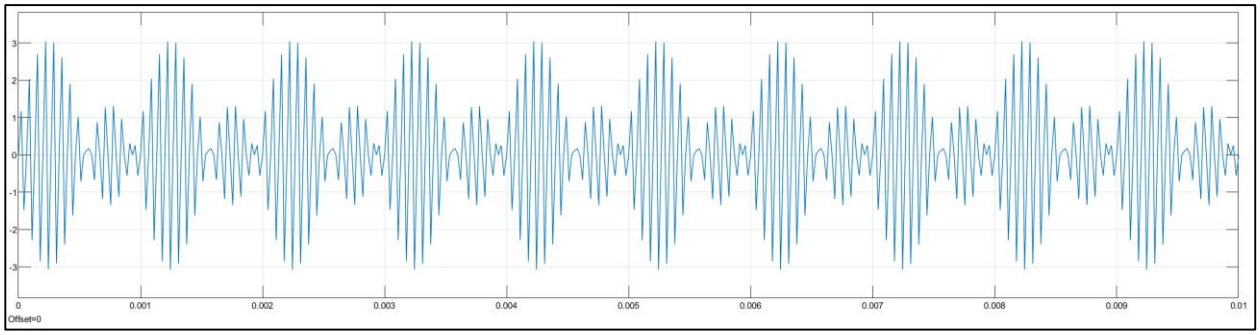

Figure 10 Modulated signal s(t) when M=3 in time domain.

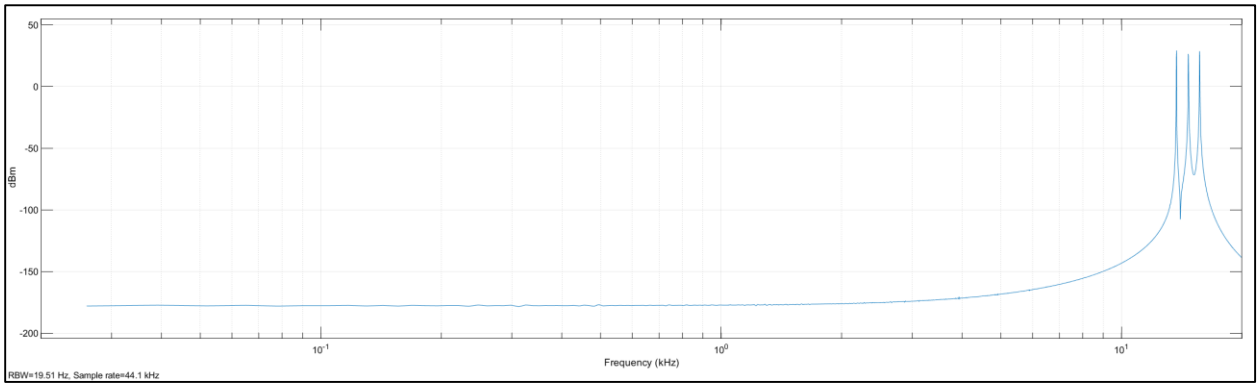

Figure 11 Modulated signal s(t) when M=3 in frequency domain.

- **Normal Amplitude Demodulation Using Coherent Method**

Using Coherent Method:

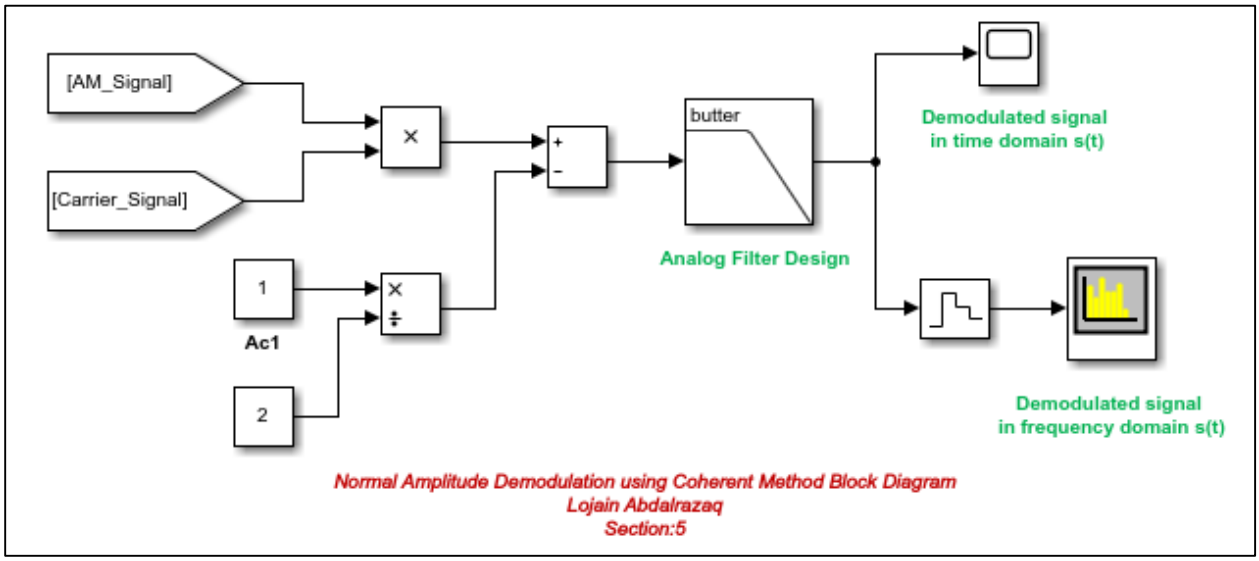

Figure 12 Demodulation using Coherent Method Block Diagram.

✓ When Modulation index < 1(M=0.2):

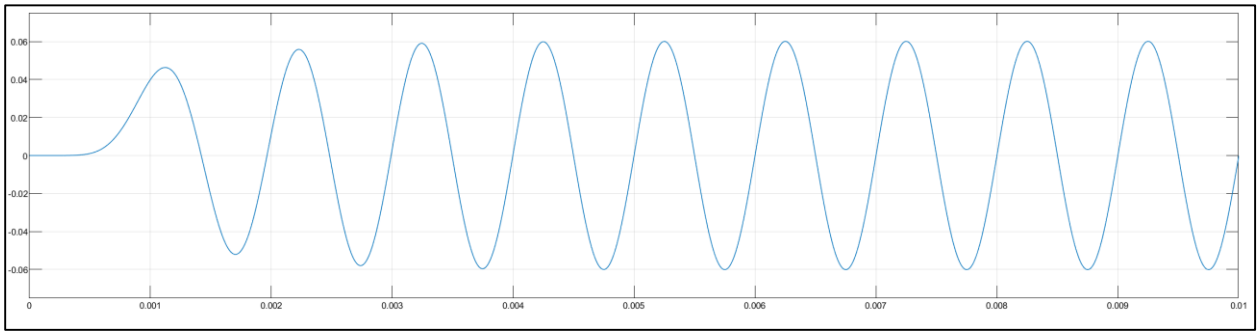

Figure 13 Demodulated signal using coherent method when M=0.2 in time domain.

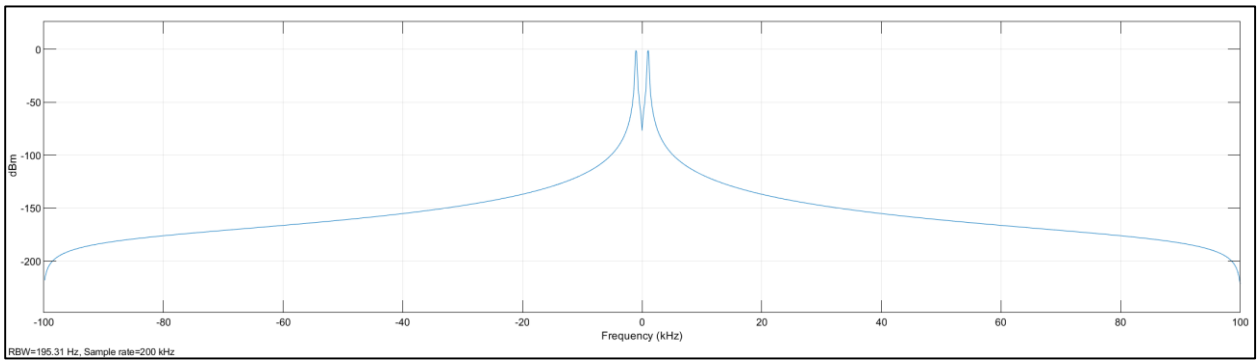

Figure 14 Demodulated signal using coherent method when M=0.2 in frequency domain.

✓ *When Modulation index = 1(M=1):*

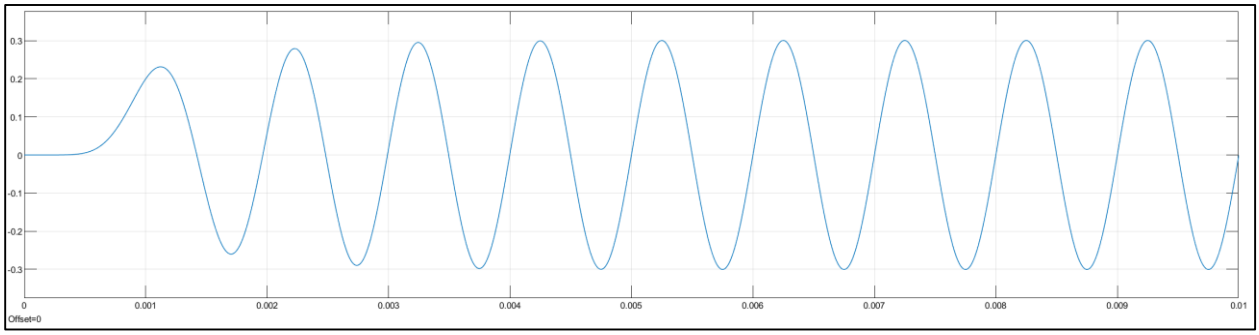

Figure 15 Demodulated signal using coherent method when M=1 in time domain.

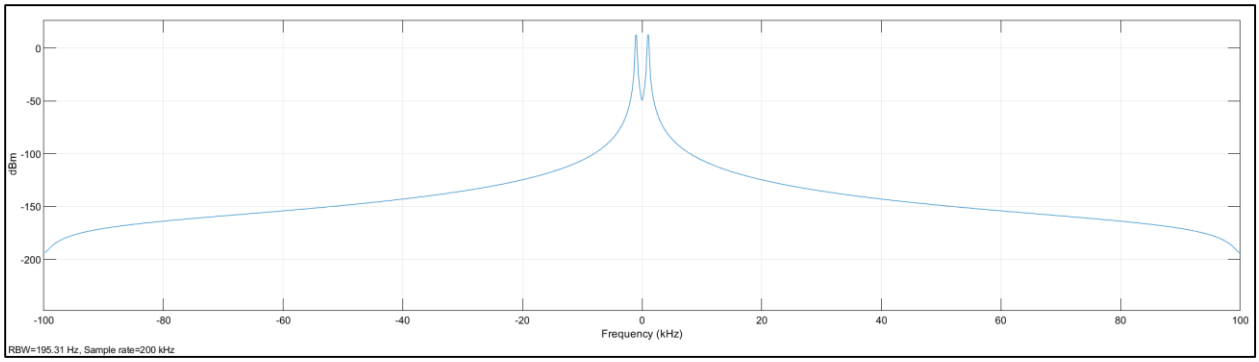

Figure 16 Demodulated signal using coherent method when M=1 in frequency domain.

✓ *When Modulation index > 1(M=3):*

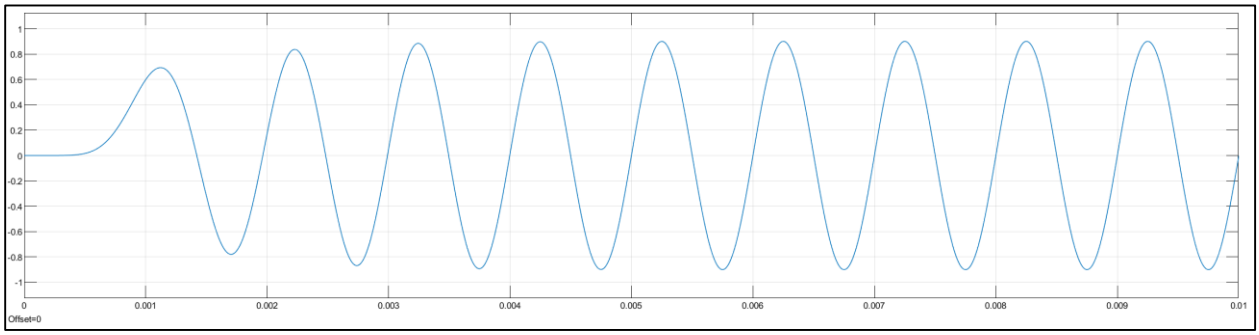

Figure 17 Demodulated signal using coherent method when M=3 in time domain.

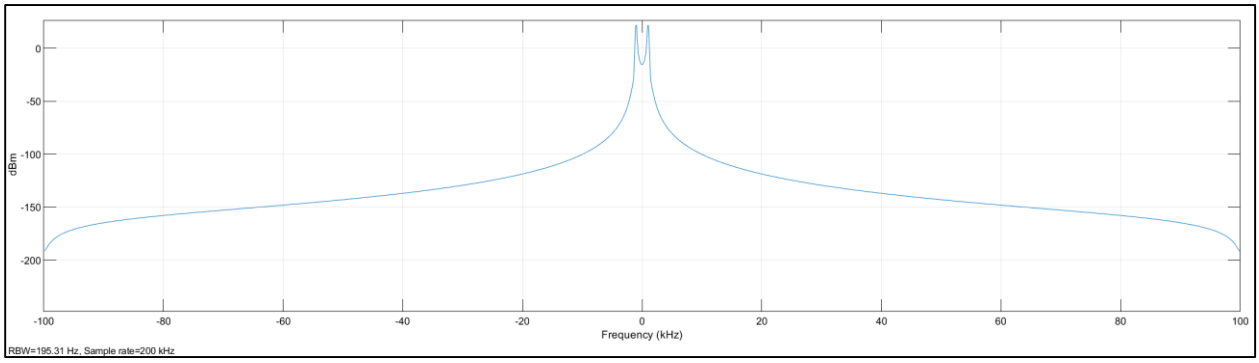

Figure 18 Demodulated signal using coherent method when M=3 in frequency domain.

- **Normal Amplitude Demodulation Using Envelop Method**

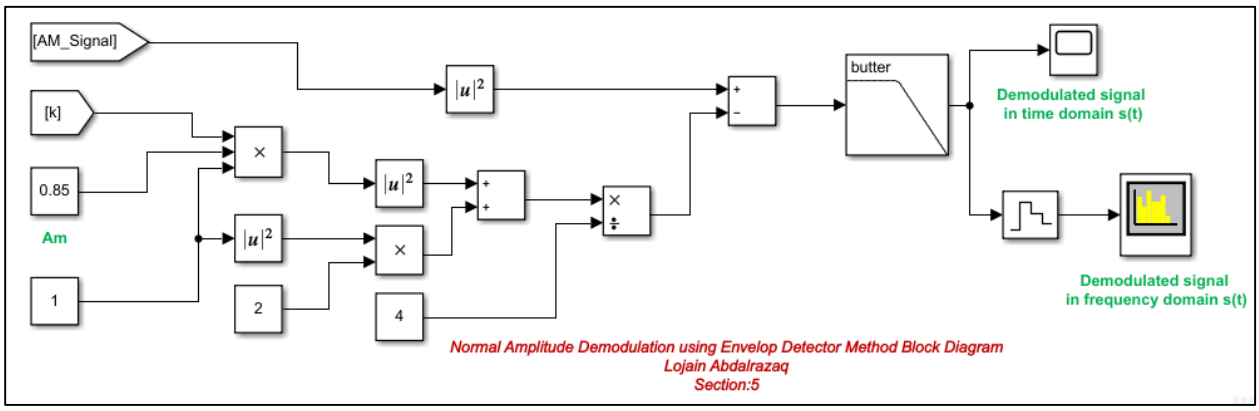

Figure 19 Demodulation using Envelop Detector Method Block Diagram.

- ✓ **Modulation index < 1(M=0.2):**

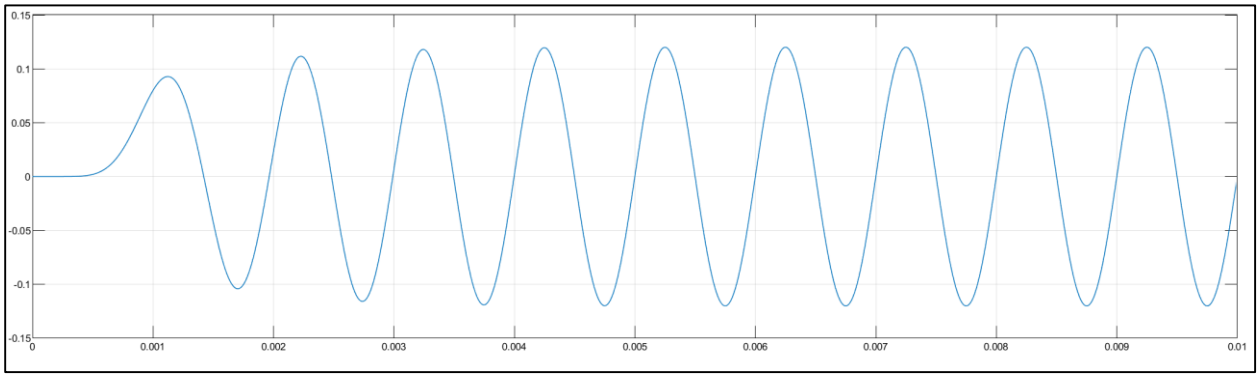

Figure 20 Demodulated signal using envelop detector method when M=0.2 in time domain.

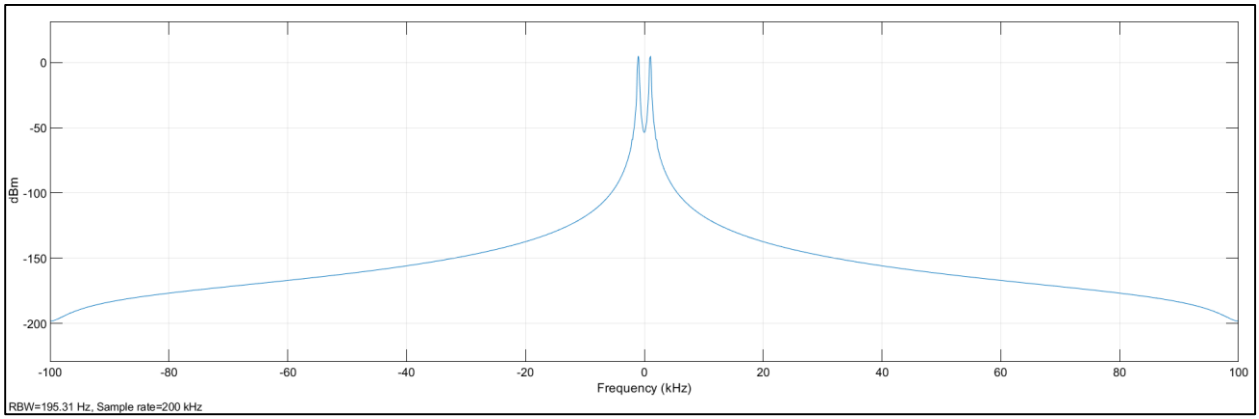

Figure 21 Demodulated signal using envelop detector method when M=0.2 in frequency domain.

✓ Modulation index = 1(M=1):

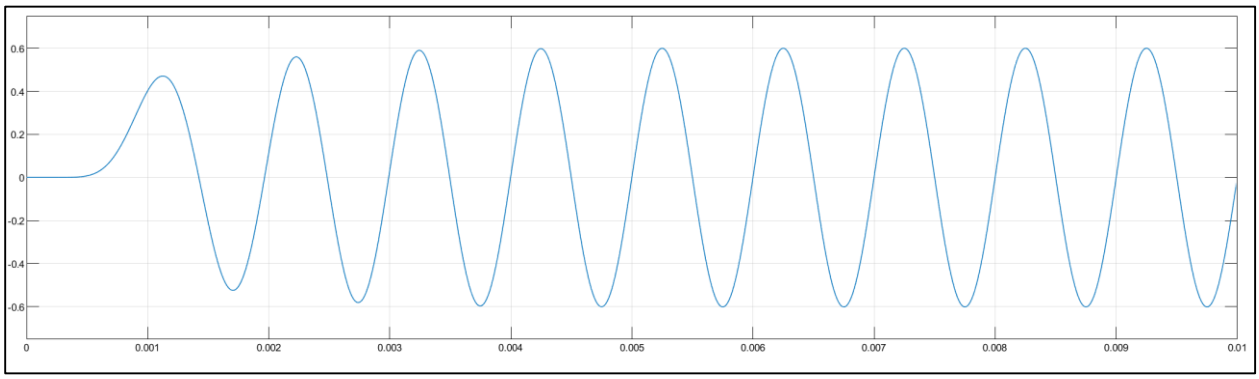

Figure 23 Demodulated signal using envelop detector method when M=1 in time domain.

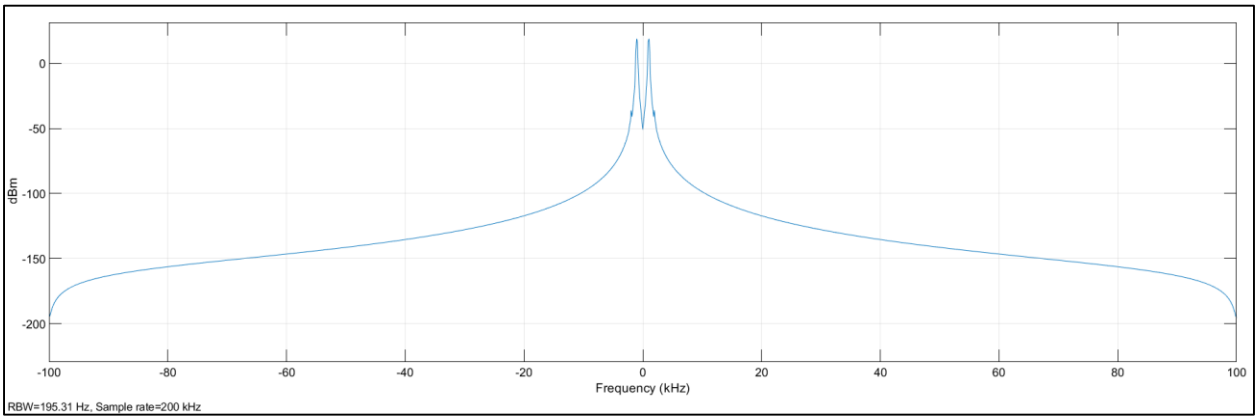

Figure 22 Demodulated signal using envelop detector method when M=1 in frequency domain.

✓ *Modulation index > 1(M=3):*

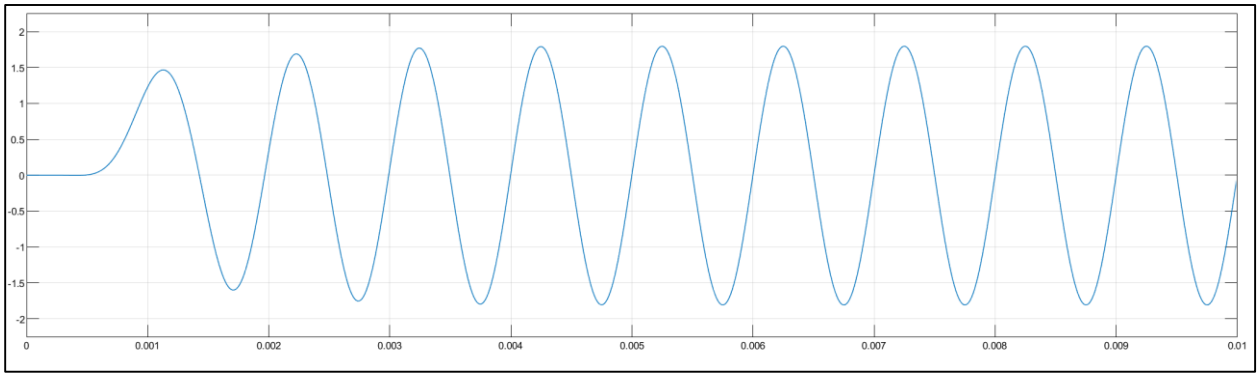

Figure 24 Demodulated signal using envelop detector method when M=3 in time domain.

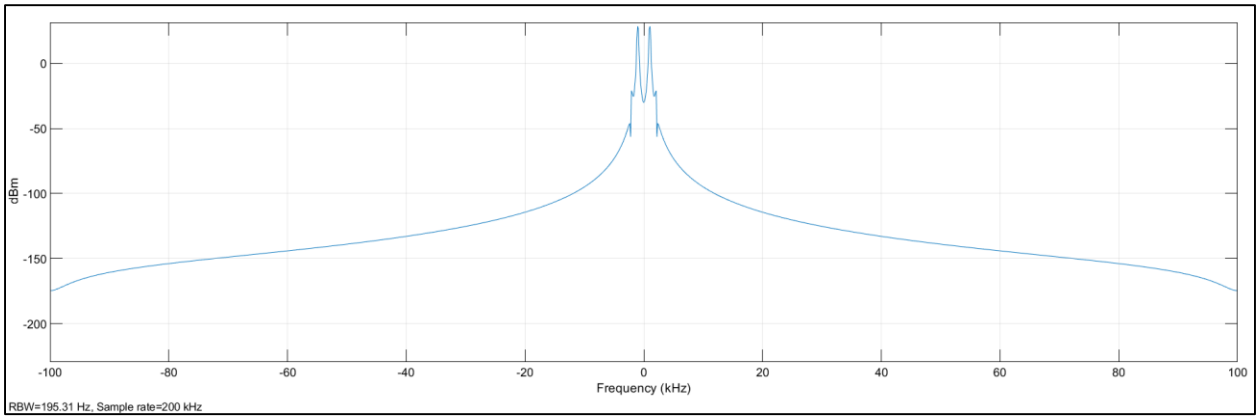

Figure 25 Demodulated signal using envelop detector method when M=3 in frequency domain.

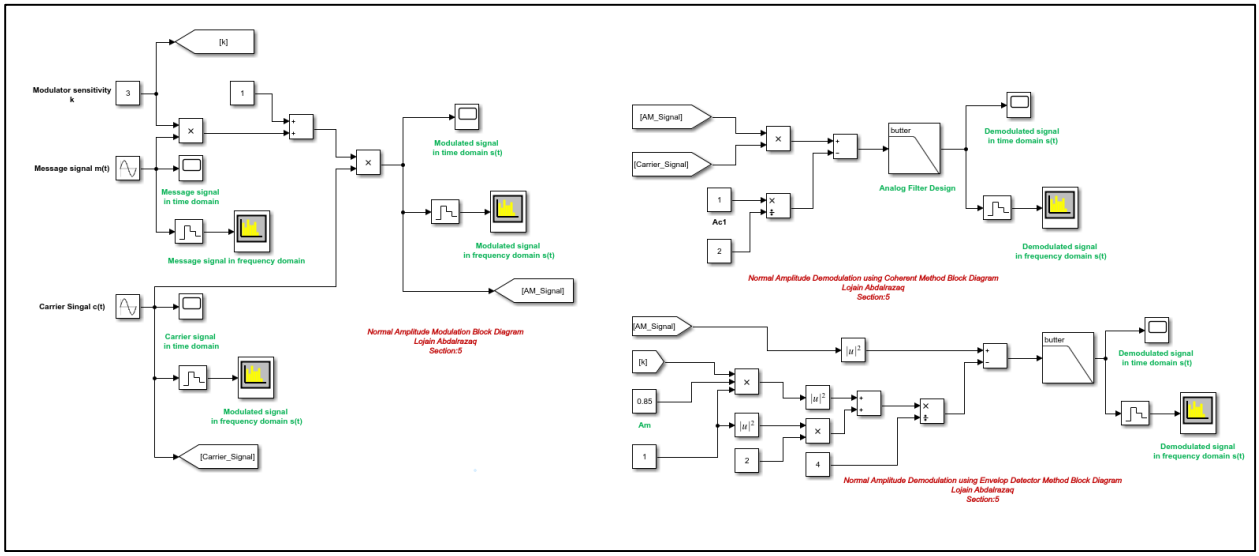

Figure 26 Block Diagram of Modulation and Demodulation using Simulink Software.