Faculty of Engineering & Technology

Electrical & Computer Engineering Department

COMMUNICATIONS LAB

ENEE4113

Prelab #4 Experiment 6

Pulse Amplitude Modulation (Sampling)

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Section: 5

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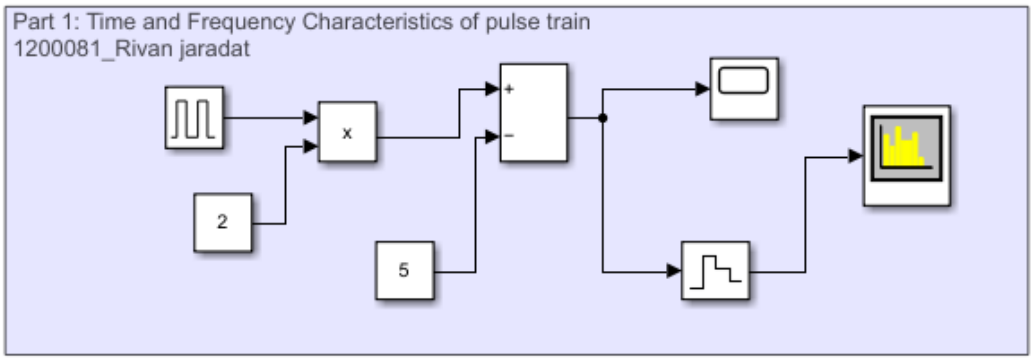


1.2. Pulse @ D=10%

Time domain:

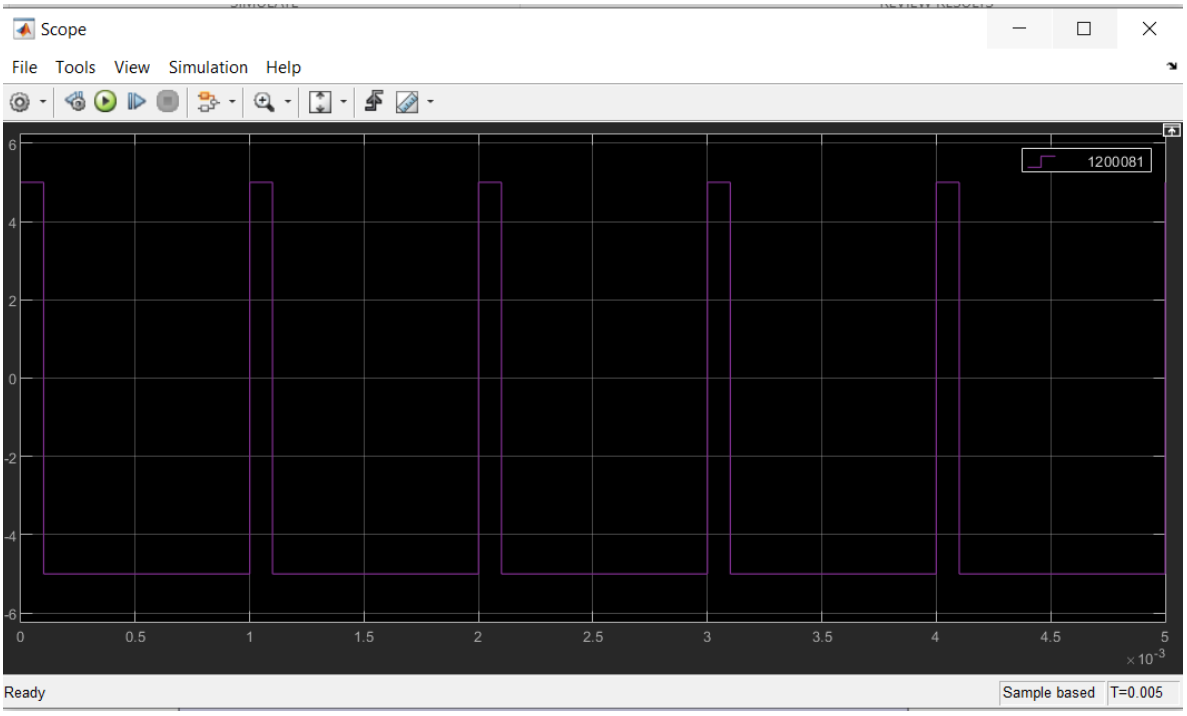


Figure 1.part1 at D=10% in time domain

1.2.2.Frequency domain:

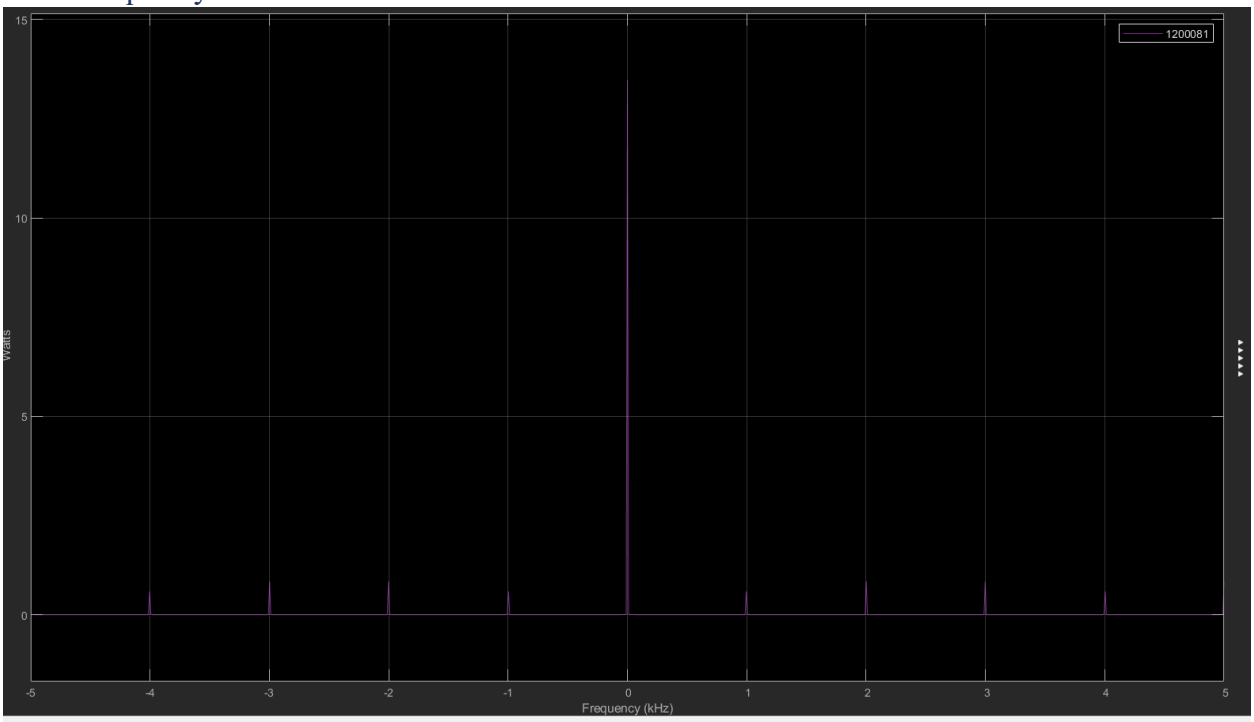


Figure 2..part1 at D=10% in frequency domain

1.2.Pulse @ D=40% :

1.2.1.Time domain:

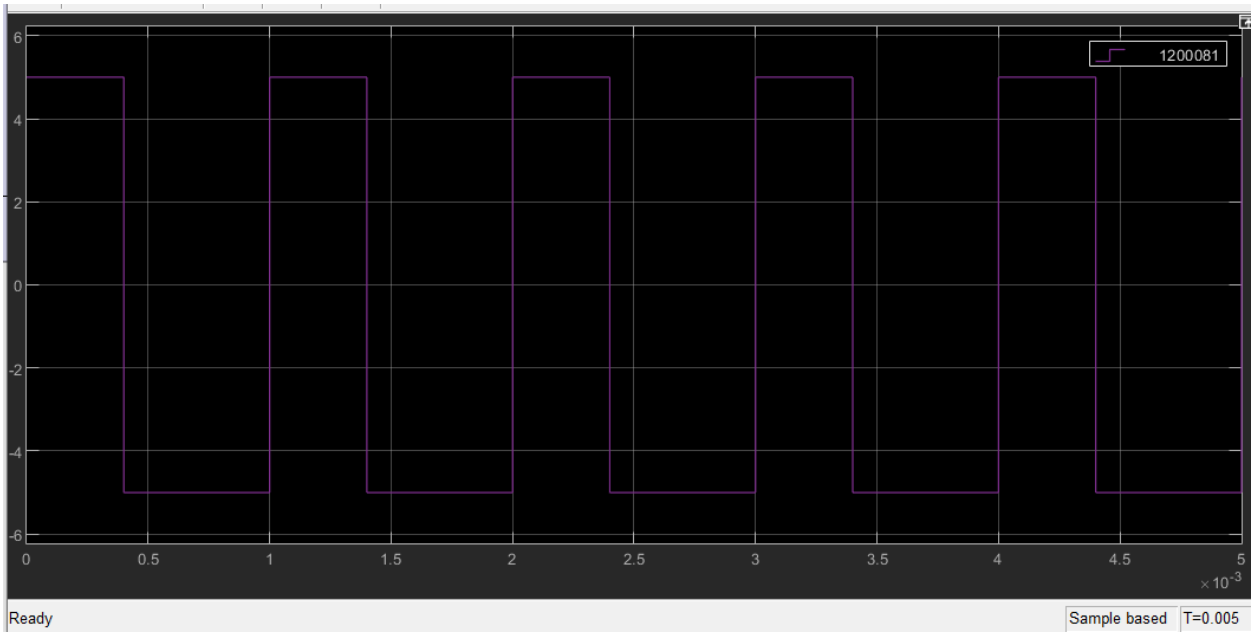


Figure 3.part1 at D=40% in time domain

1.2.2.Frequency domain:

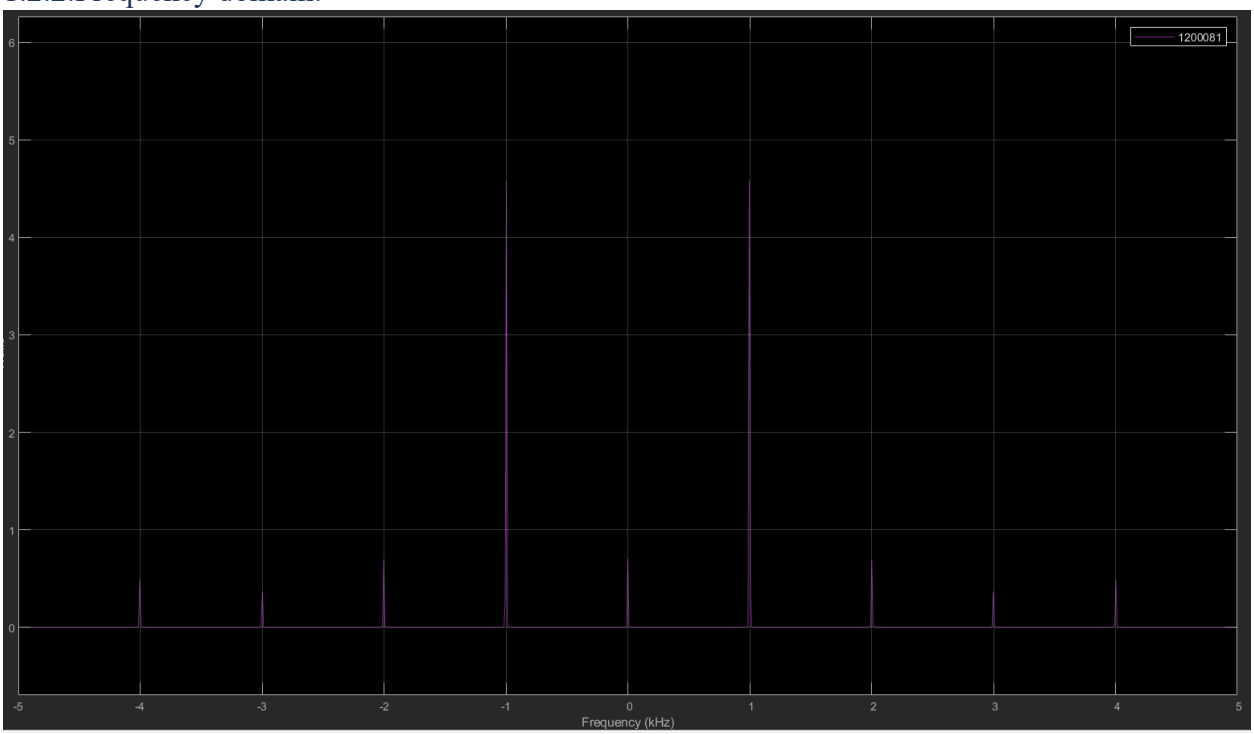


Figure 4.part1 at D=40% in frequency domain

2.Part 2: Modulating signal (message signal)

2.1.block diagram:

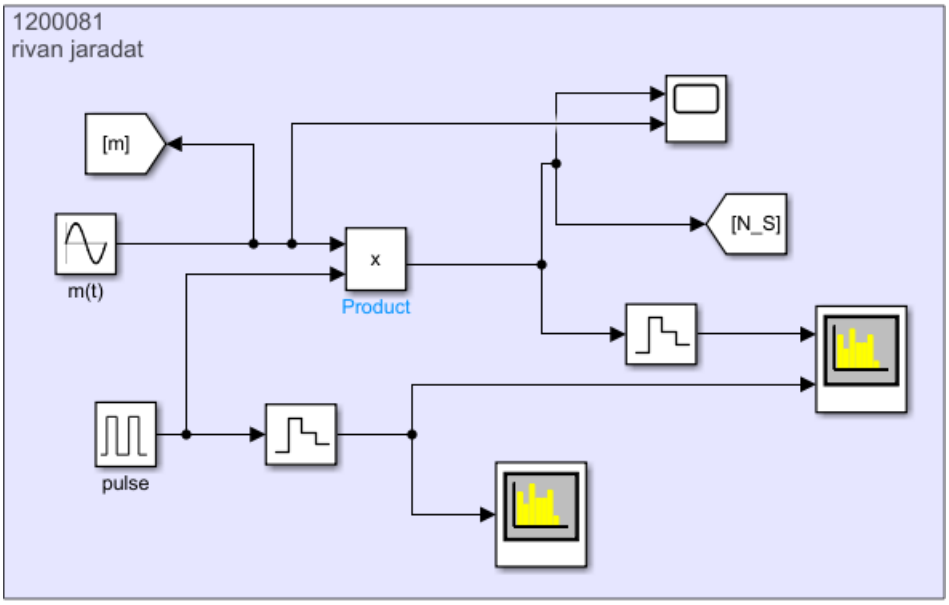


Figure 5block diagram for Modulating signal (message signal)

2.2.Modulated signal @ fm=500Hz & D=50%:

2.2.1Time domain :

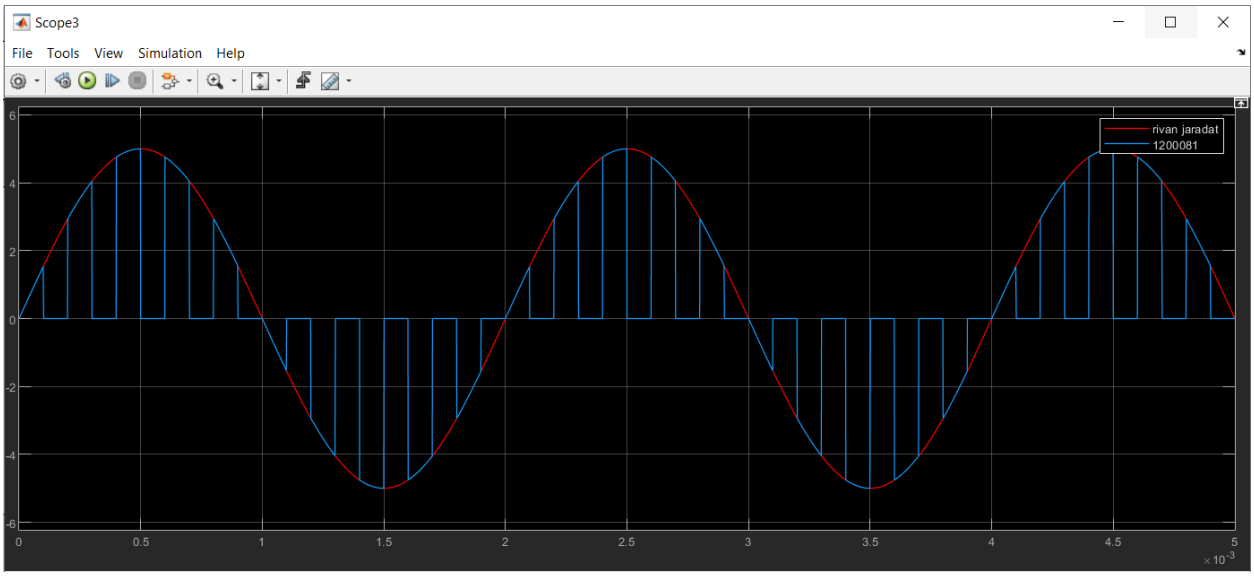


Figure 6.Modulatem(t)&s(t) @ fm=500Hz & D=50% in time domain

2.2.2.Frequency domain:

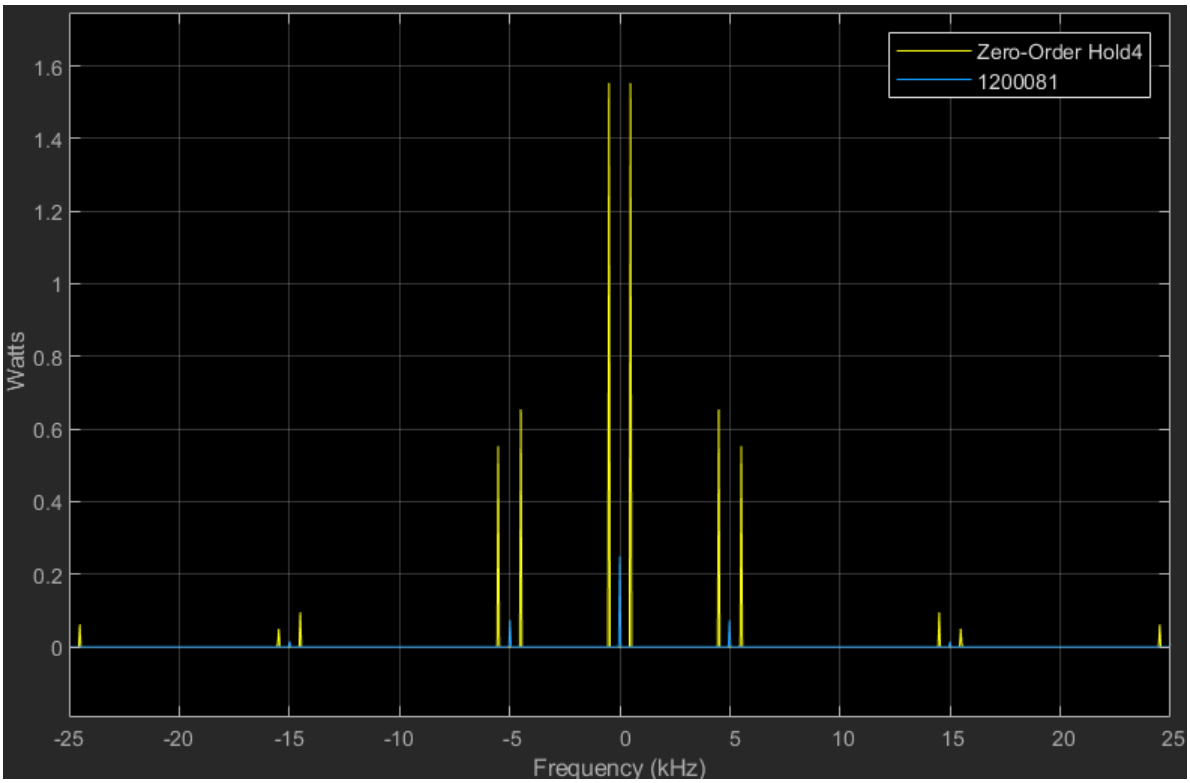


Figure 7.Modulatem(t)&s(t) @ fm=500Hz & D=50% in frequency domain

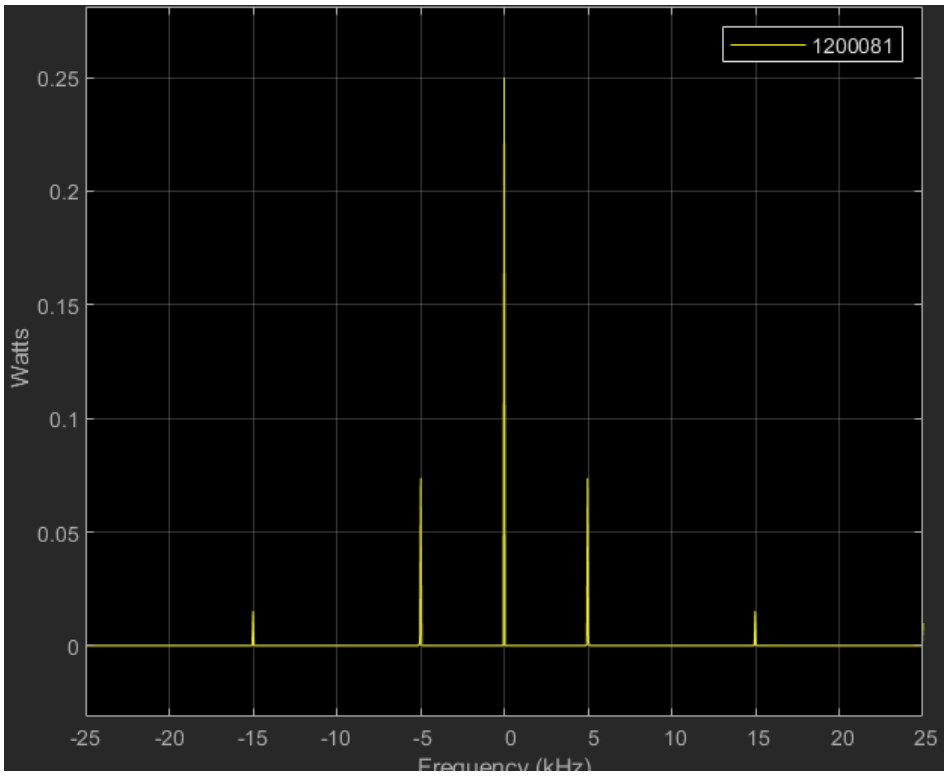


Figure 8..pulse train in frequency domain @D=50%

2.3.Modulated signal @ fm=500Hz & D=10%

2.3.1.Time domain :

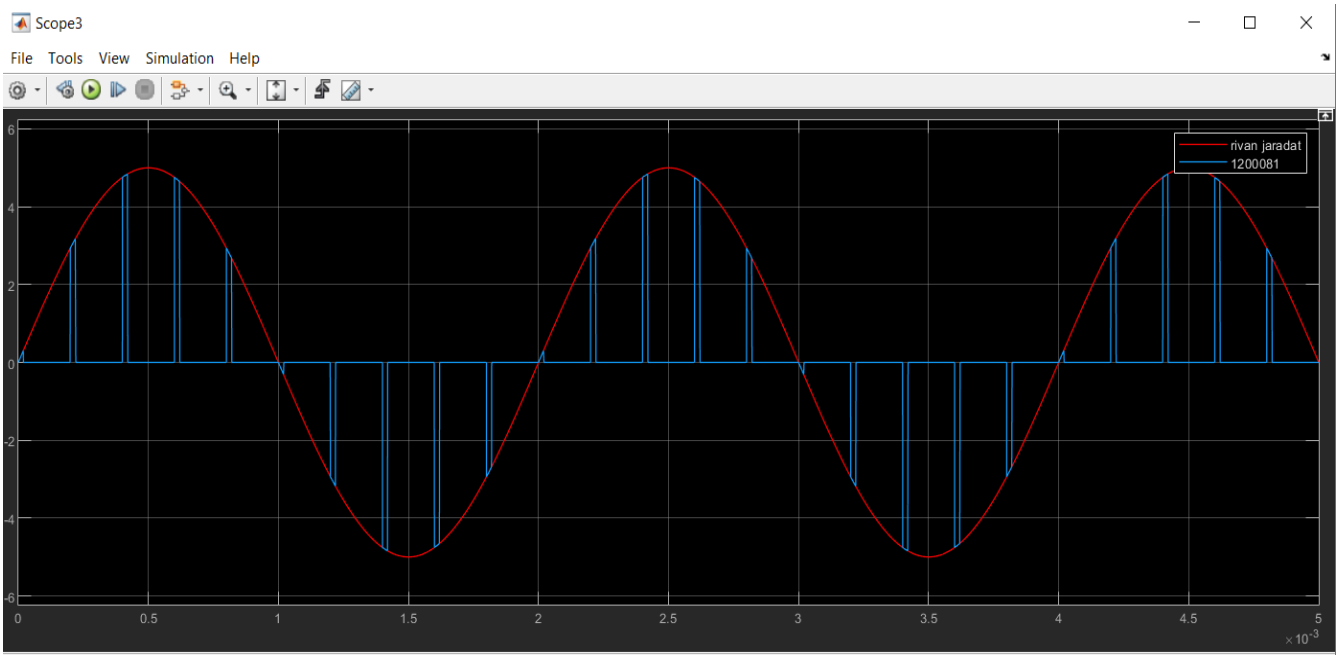


Figure 9.Modulatem(t)&s(t) @ fm=500Hz & D=10% in time domain

2.3.2.Frequency domain:

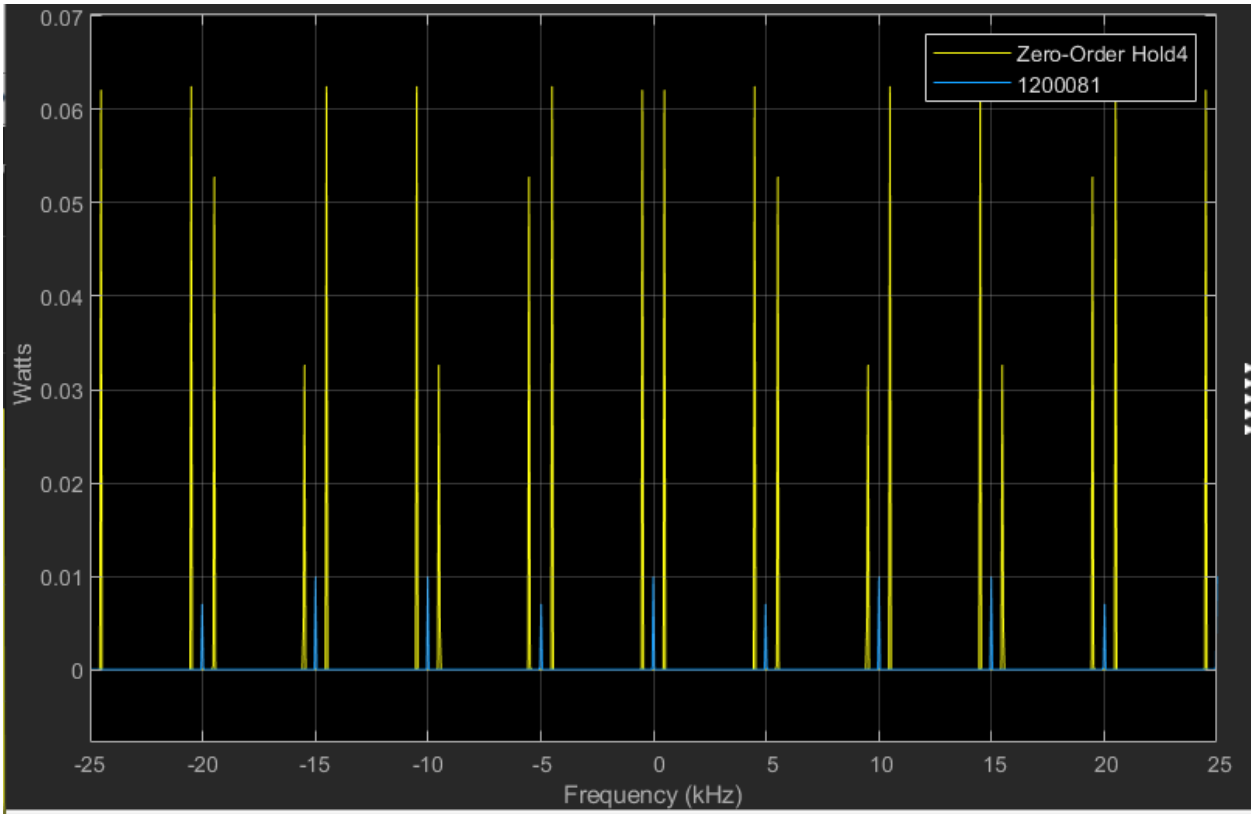


Figure 10.Modulatem(t)&s(t) @ fm=500Hz & D=10% in frequency domain

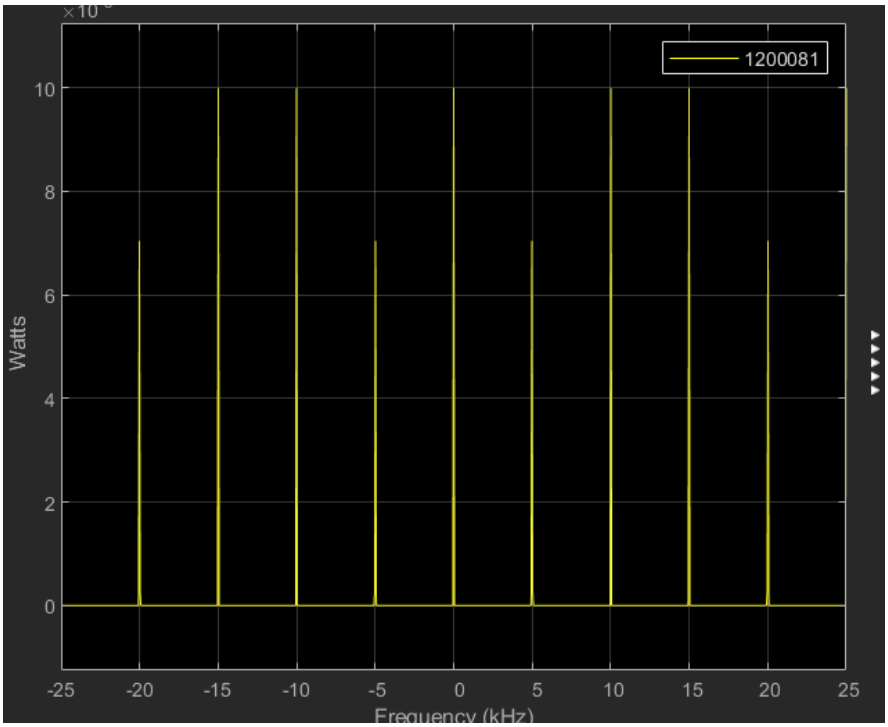


Figure 11..pulse train in frequency domain @D=10%

2.4.Modulated signal @ fm=500Hz & D=30%

2.4.1.Time domain :

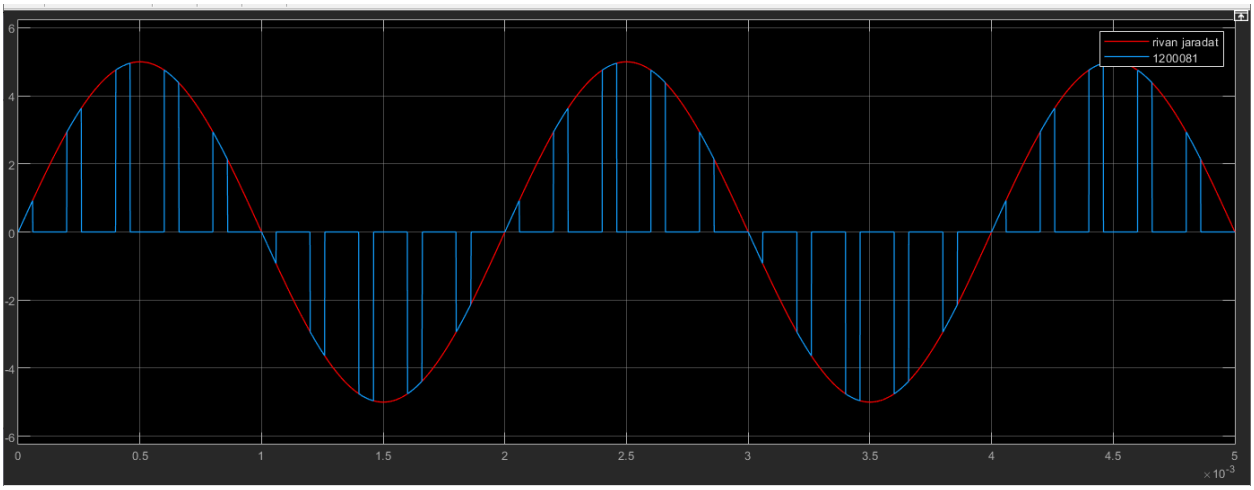


Figure 12.Modulatem(t)&s(t) @ fm=500Hz & D=30% in time domain

2.4.2.Frequency domain:

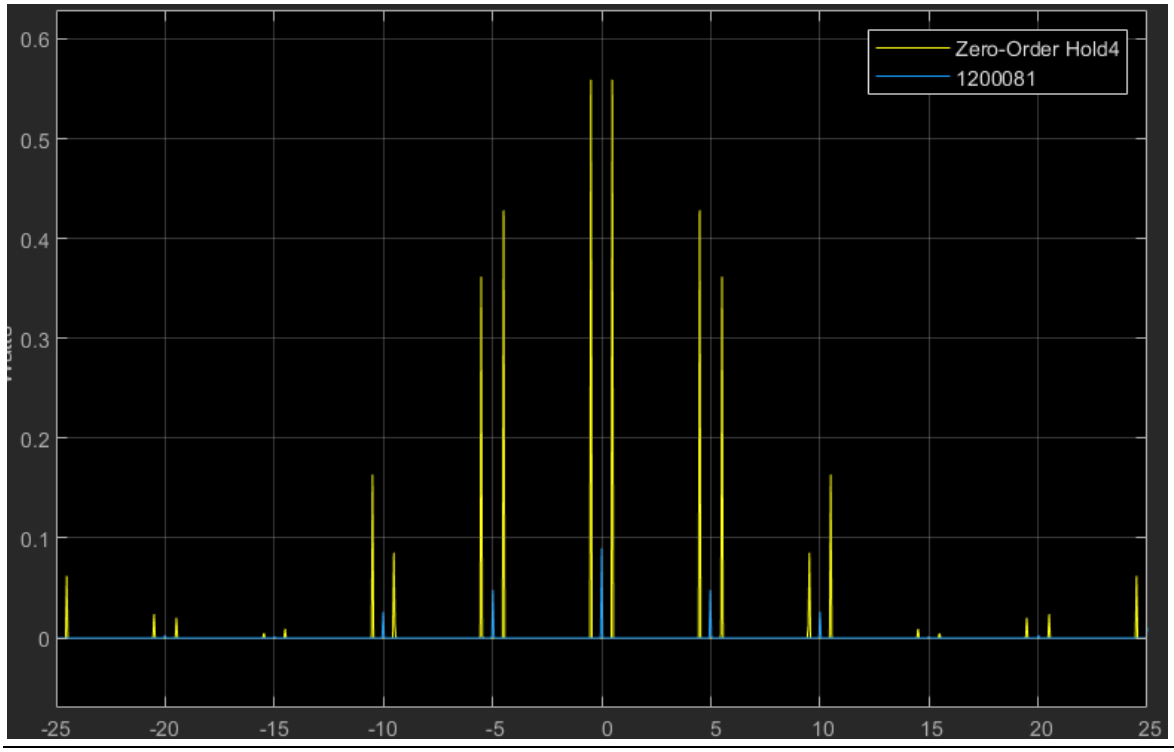


Figure 13.m(t)&s(t) @ fm=500Hz & D=30% in frequency domain

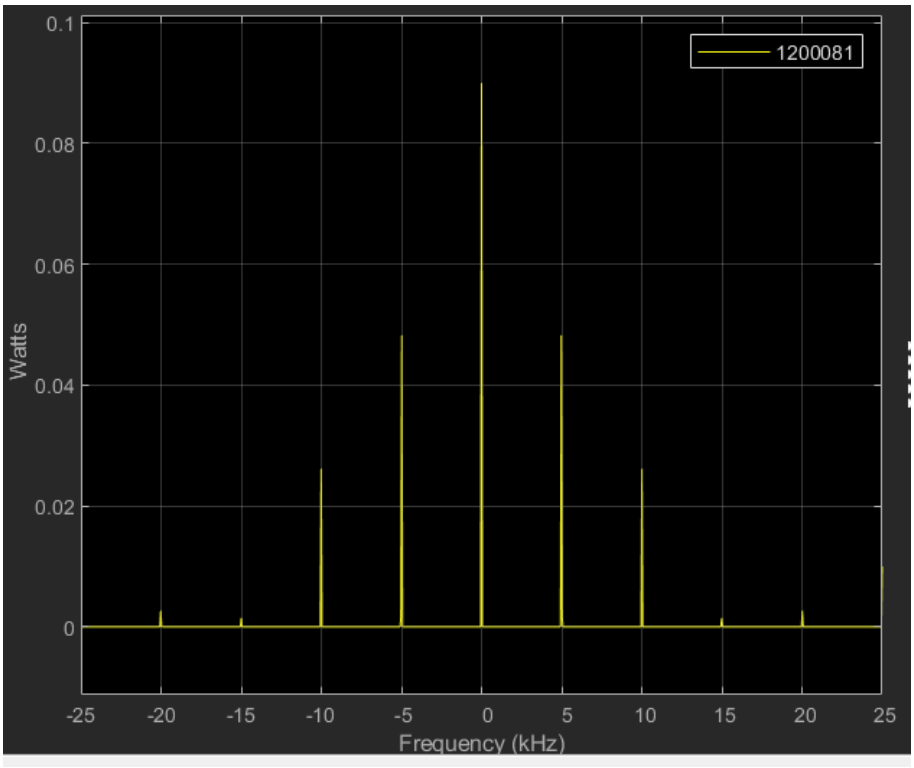


Figure 14..pulse train in frequency domain @D=30%

2.5.Modulated signal @ fm=1000Hz & D=50%

2.5.1.Time domain :

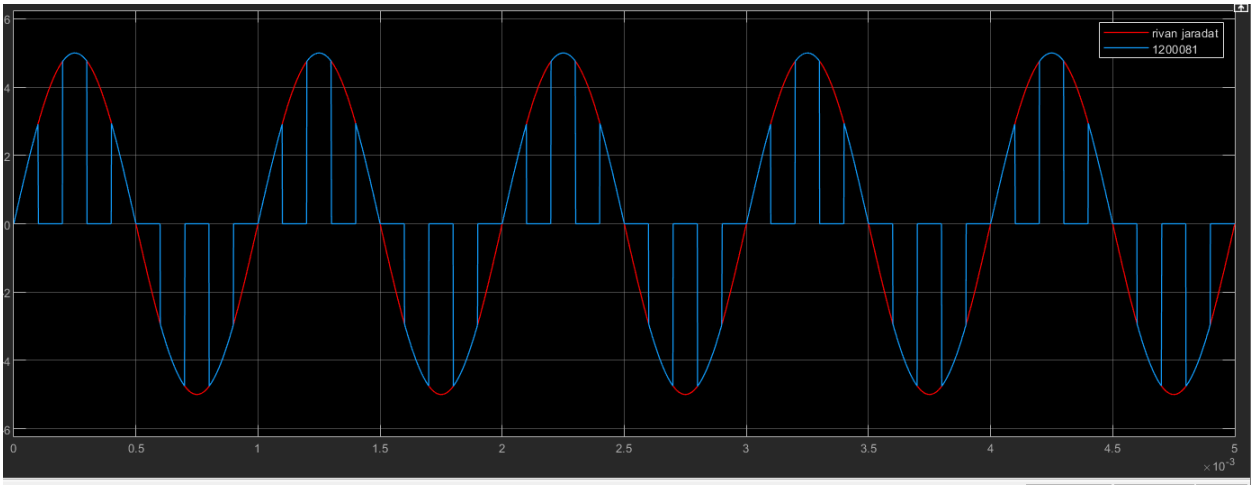


Figure 15.m(t)&s(t) @ fm=1000Hz & D=50% in time domain

2.5.2.Frequency domain

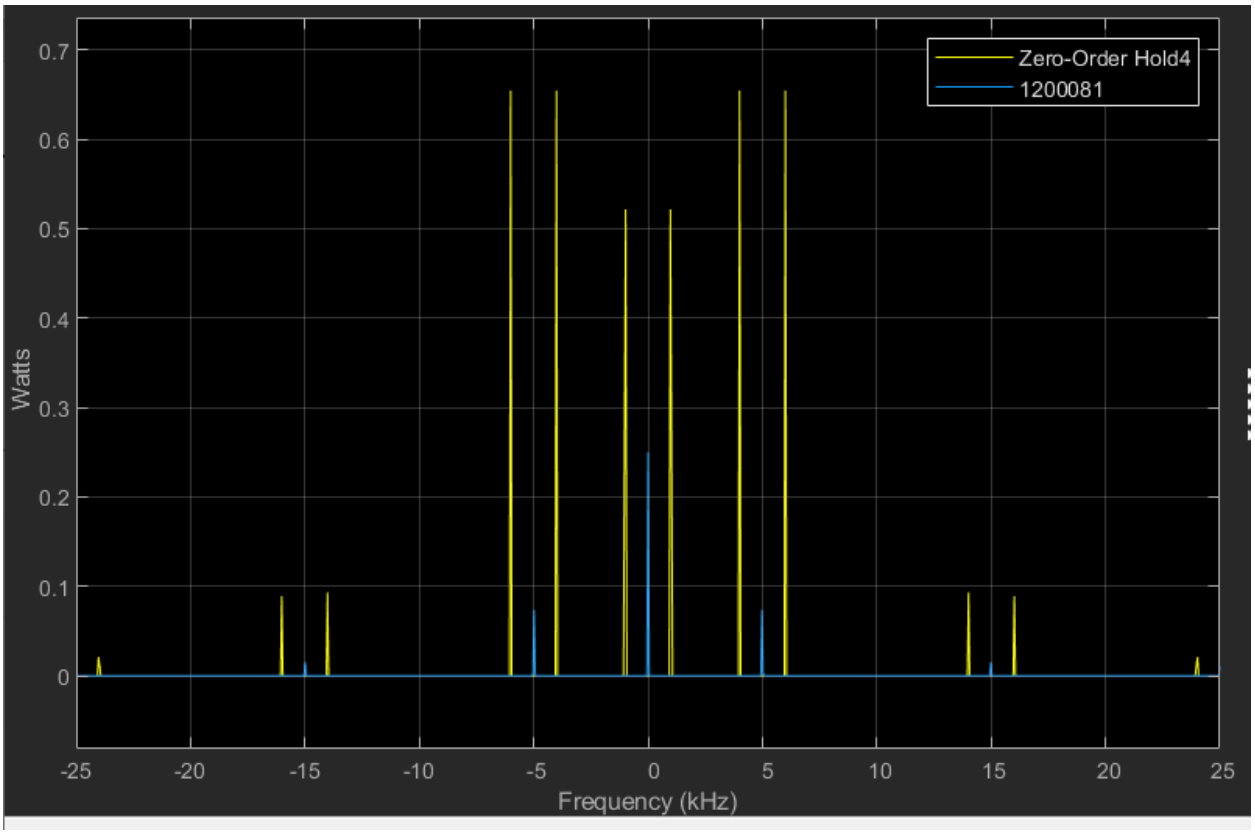


Figure 16.m(t)&s(t) @ fm=1000Hz & D=50% in frequency domain

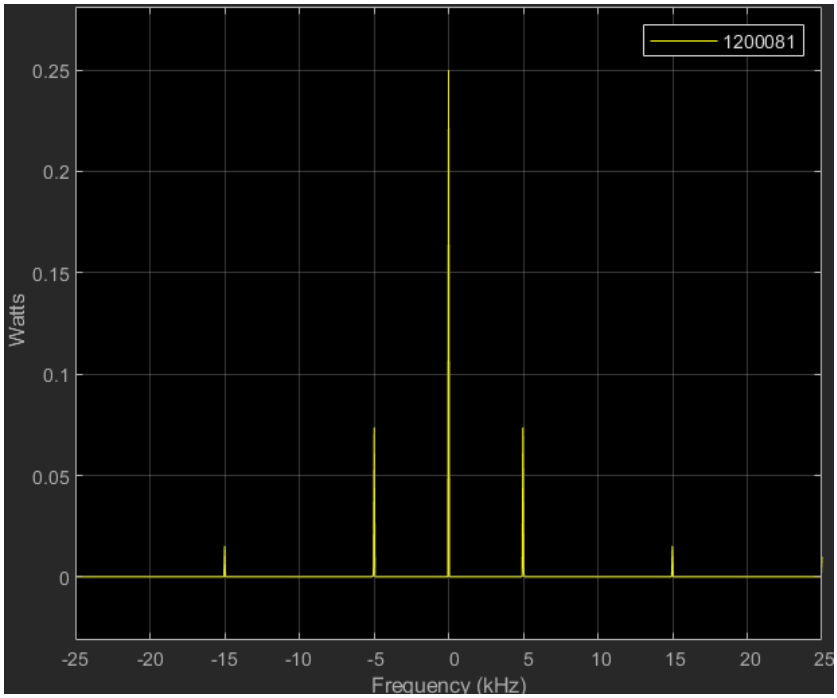


Figure 17..pulse train in frequency domain @D=50%

2.6.Modulated signal @ fm=2000Hz & D=50%:

2.6.1.Time domain :

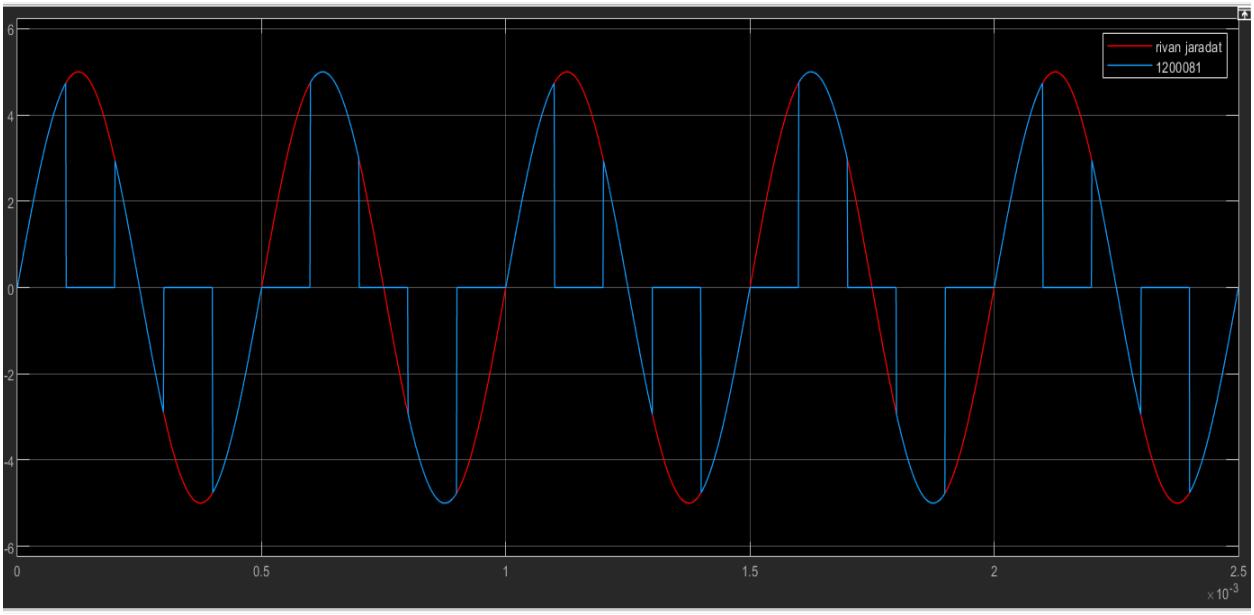


Figure 18.m(t)&s(t) @ fm=2000Hz & D=50% in time domain

2.6.2.Frequency domain

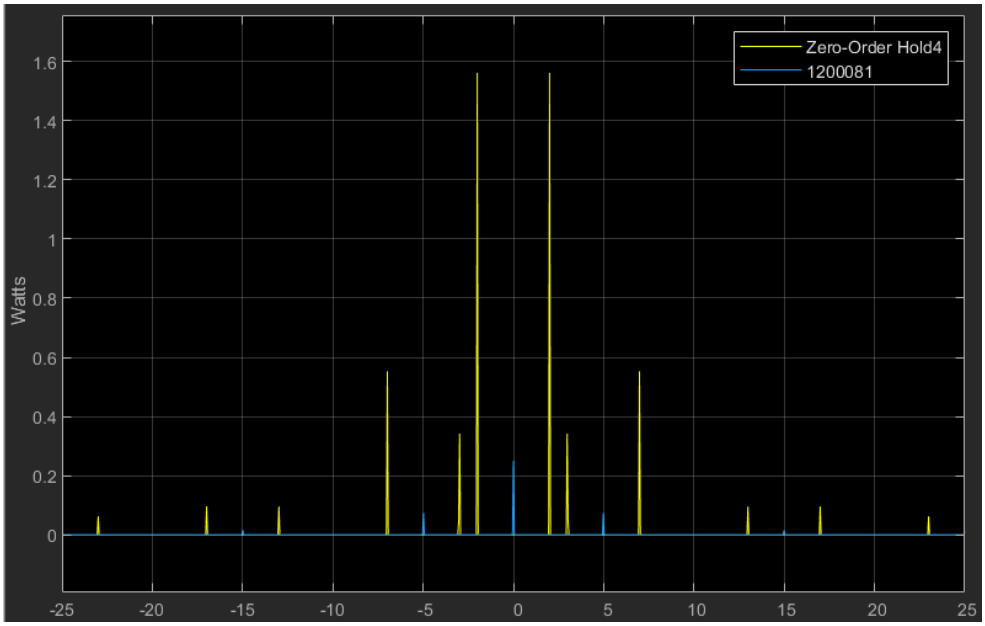


Figure 19.m(t)&s(t) @ fm=2000Hz & D=50% in frequency domain

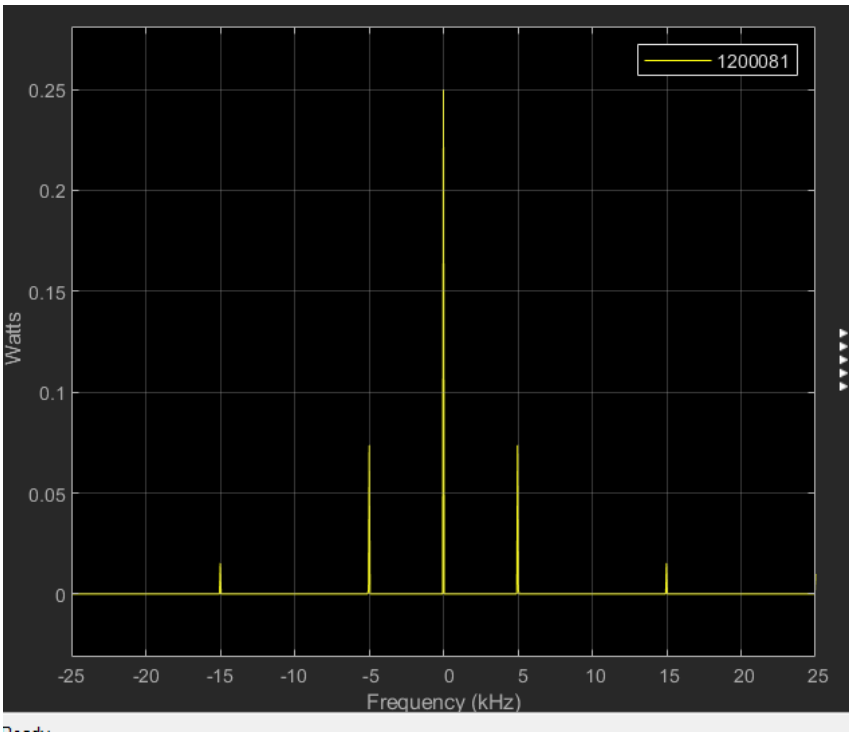
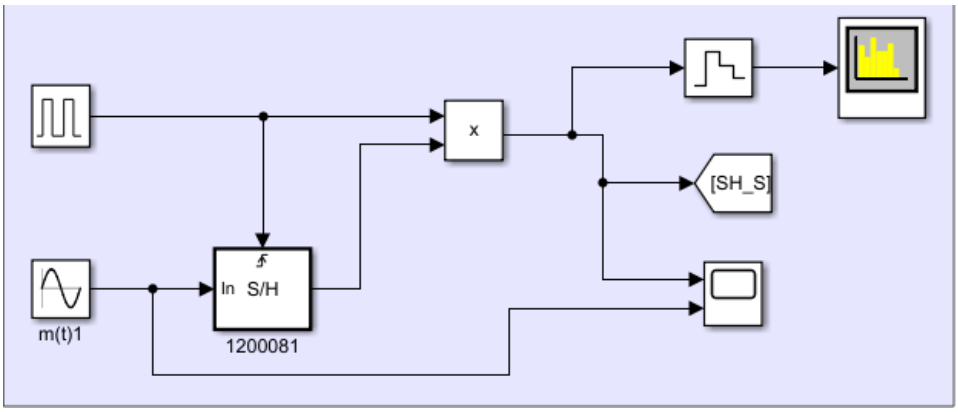
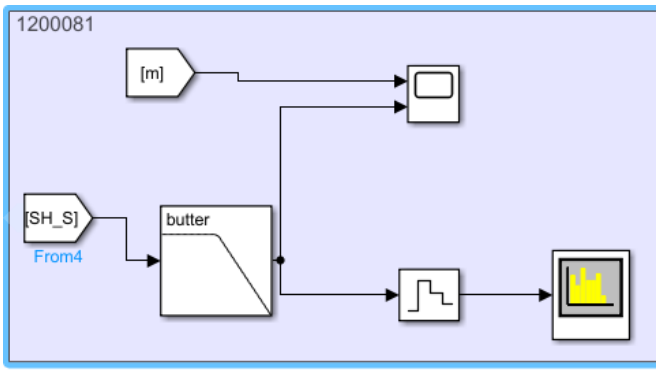


Figure 20.pulse train in frequency domain @D=50%

3.Sample and Hold (flat topped) Sampling

Block diagram:





3.2. Modulated signal @ fm=500Hz & D=50%

Time domain:

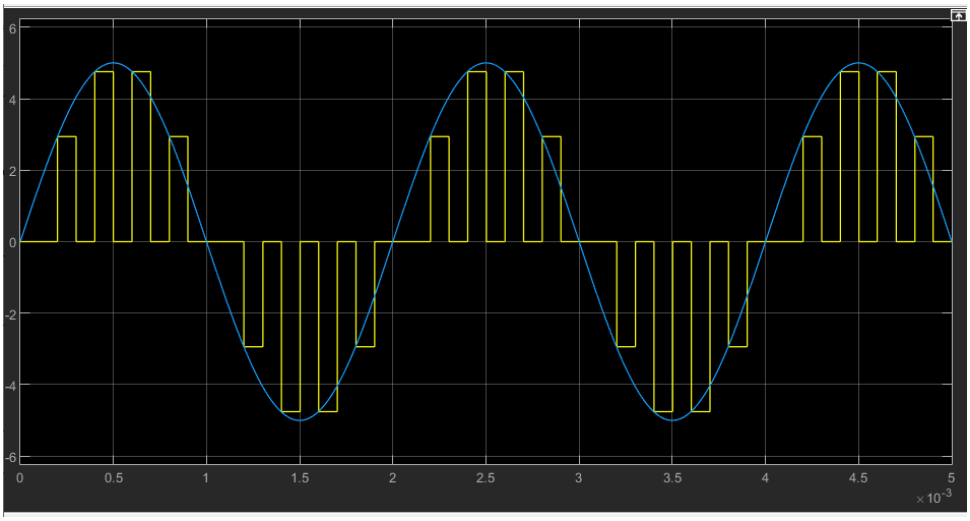


Figure 21.m(t)&s(t) @ fm=500Hz & D=50% in time domain

Frequency domain:

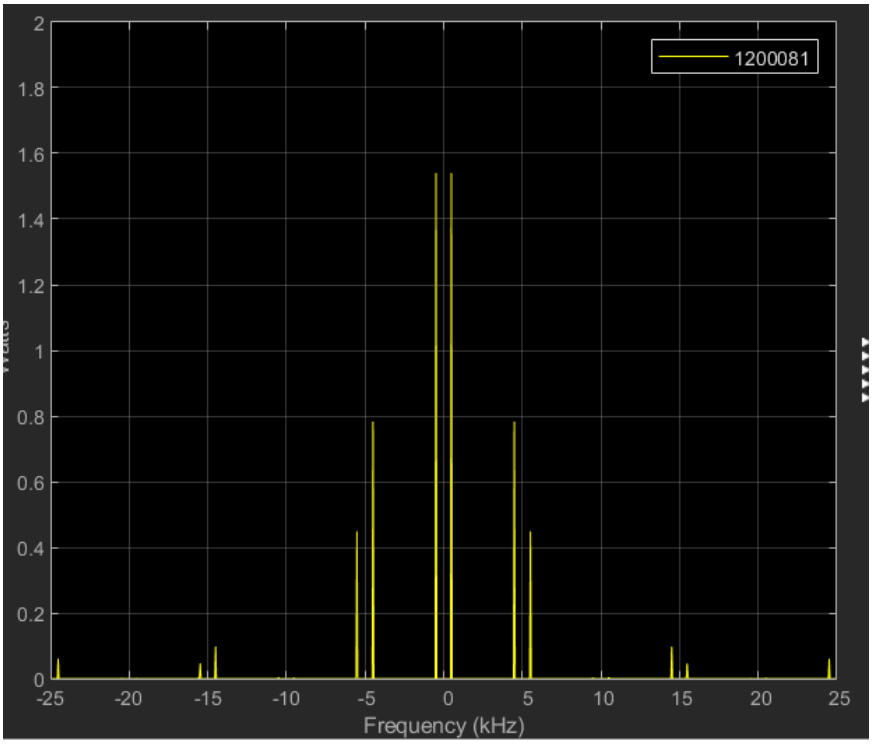


Figure 22.s(t) ,m(t)@ fm=1000Hz & D=50% in frequency domain

3.3.Modulated signal @ fm=500Hz & D=10%

Time domain:

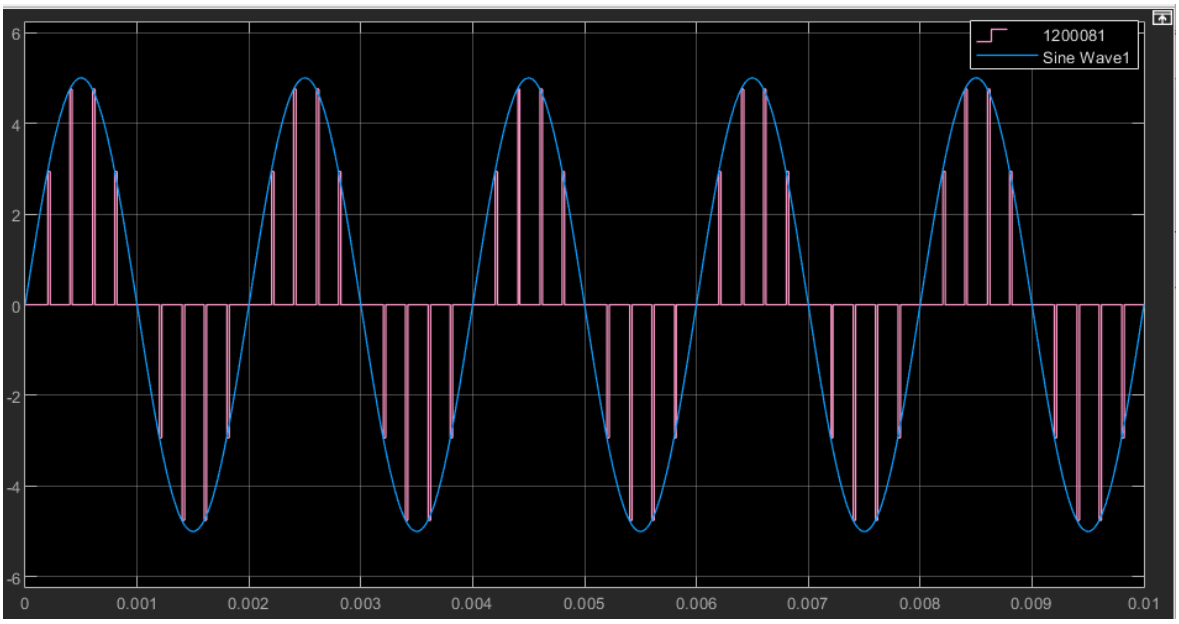


Figure 23.s(t) ,m(t)@ fm=500Hz & D=10% in time domain

Frequency domain:

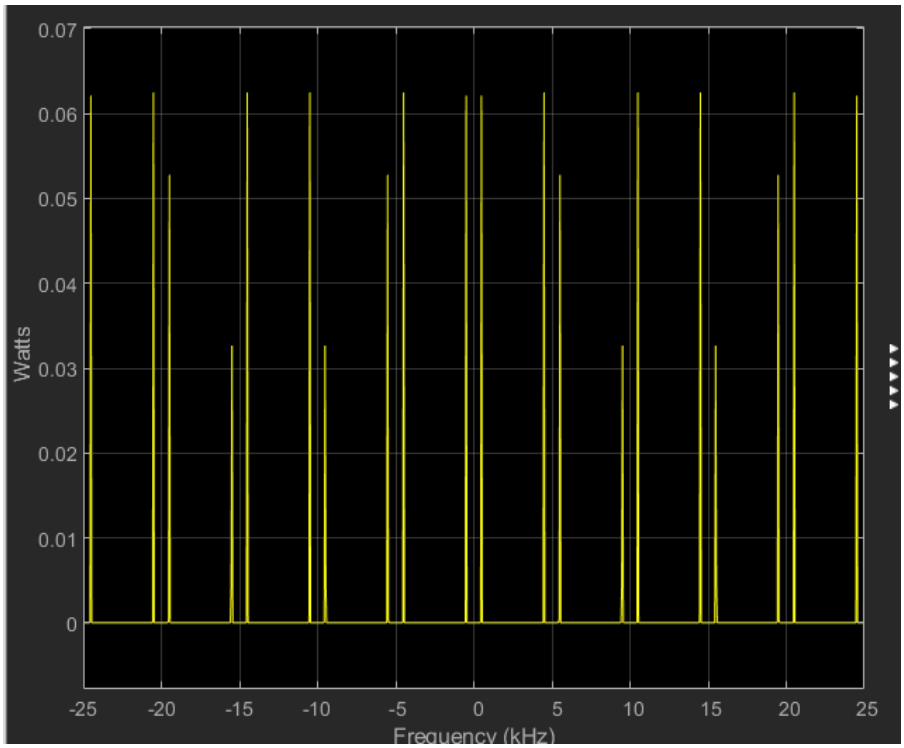


Figure 24.S(T) in frequency domain

3.4.Modulated signal @ fm=500Hz & D=30%

Time domain:

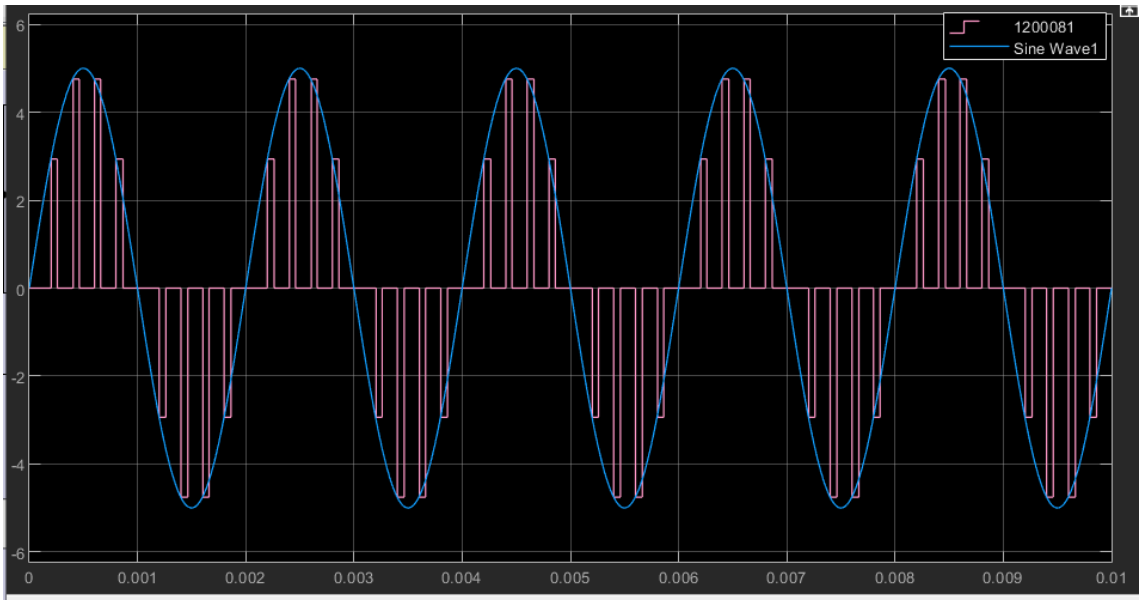


Figure 25.s(t) ,m(t)@ fm=500Hz & D=30% in time domainFrequency domain:

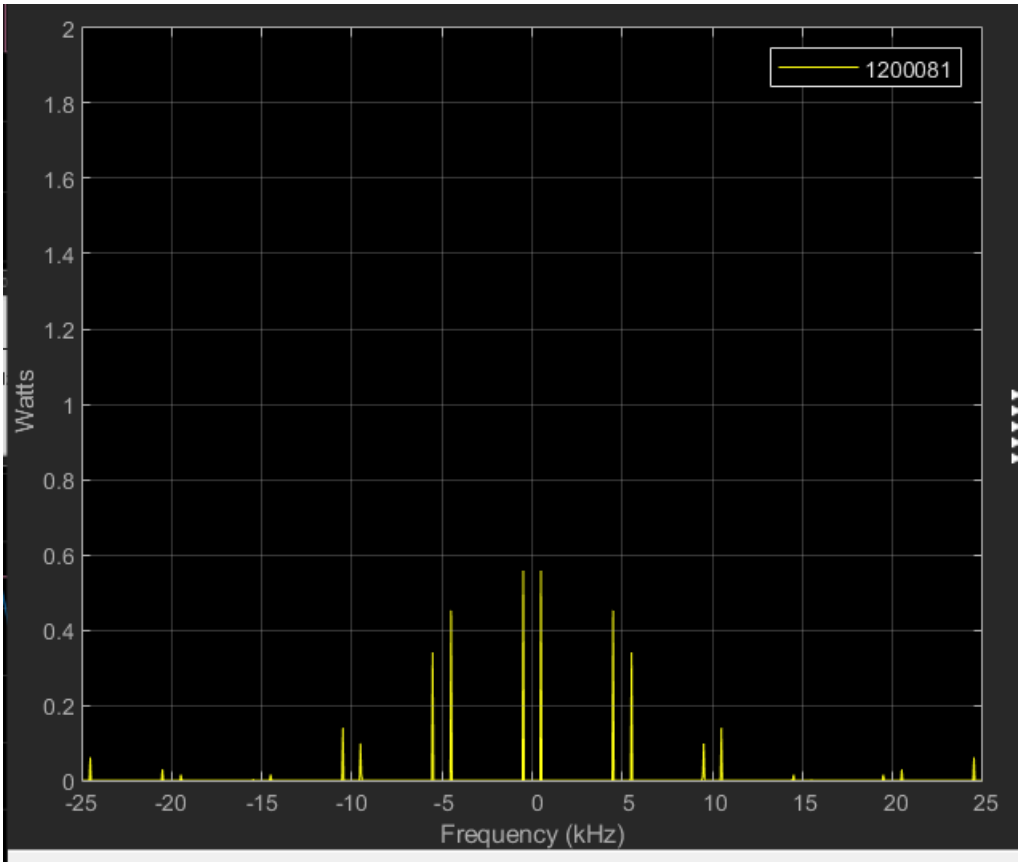


Figure 26.s(t) in frequency domain

3.5.Modulated signal @ fm=1000Hz & D=50%

Time domain:

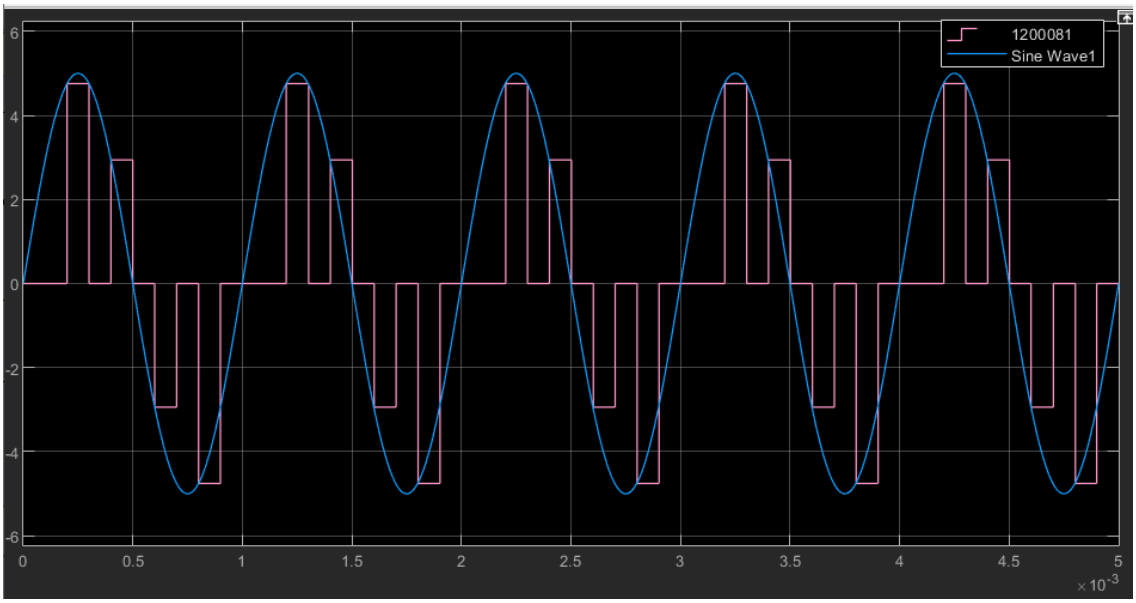


Figure 27.s(t) ,m(t)@ fm=1000Hz & D=50% in time domain

Frequency domain:

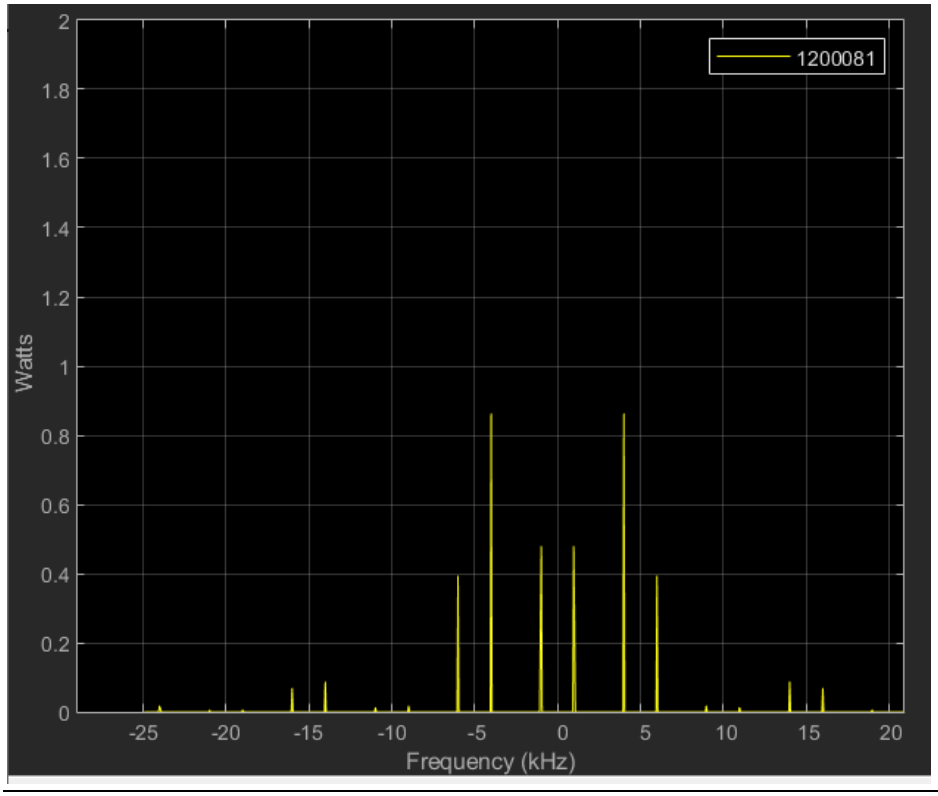


Figure 28.s(t) in frequency domain

3.6.Modulated signal @ fm=2000Hz & D=50%

Time domain:

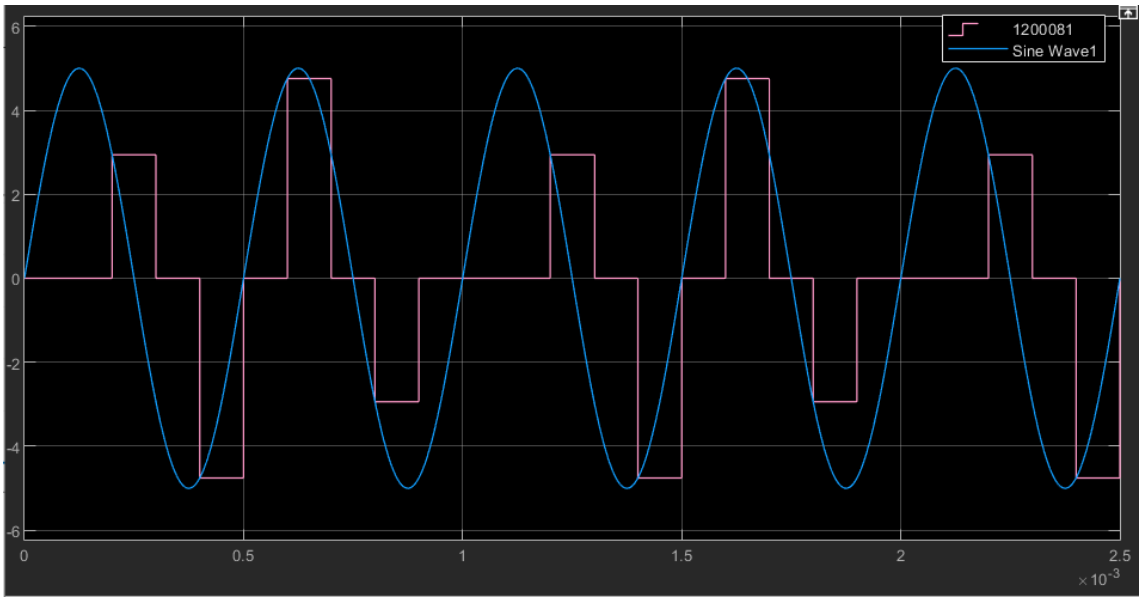


Figure 29.s(t) ,m(t)@ fm=2000Hz & D=50% in time domain

Frequency domain:

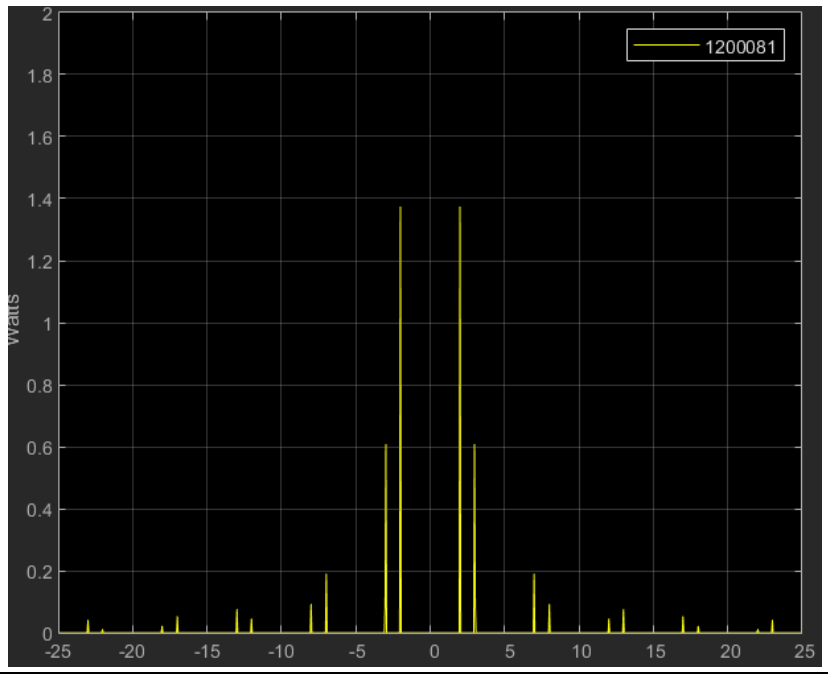
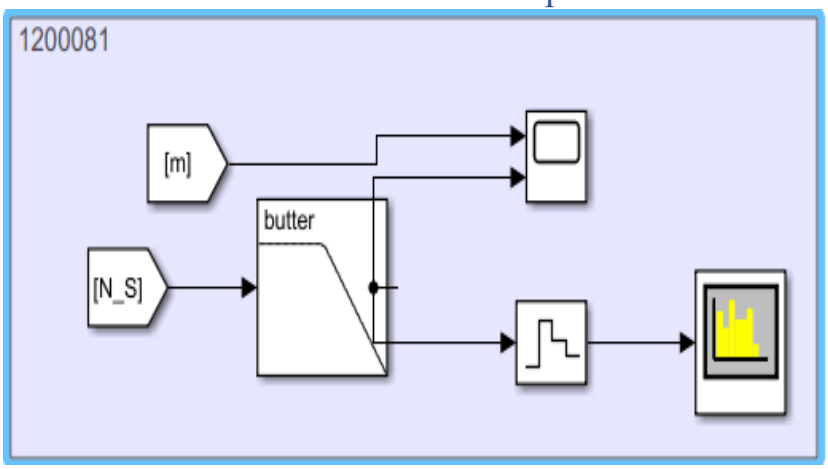


Figure 30.s(t) in frequency domain

4.Part 3:Characteristics of Pulse Amplitude Demodulation



4.2.De-Modulated signal Natural @ fm=500 & D=50%

Time domain:

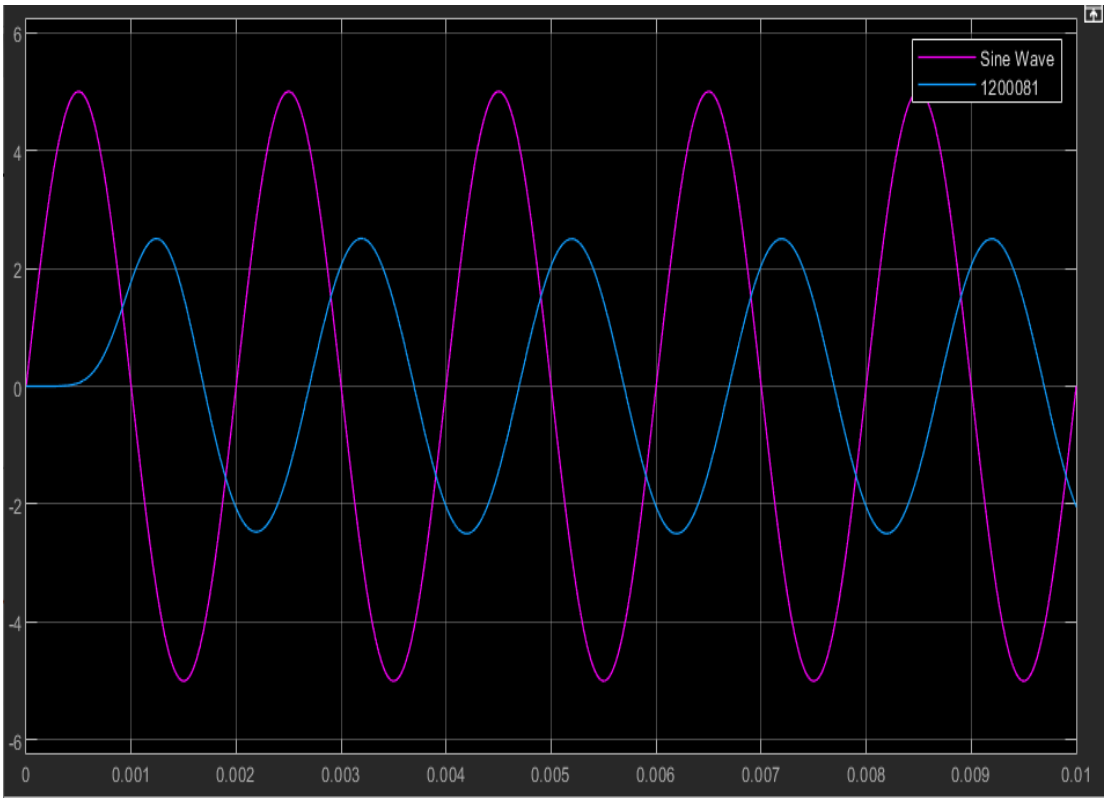


Figure 31m(t) & demodulated signal in time domain at d=50%

Frequency domain:

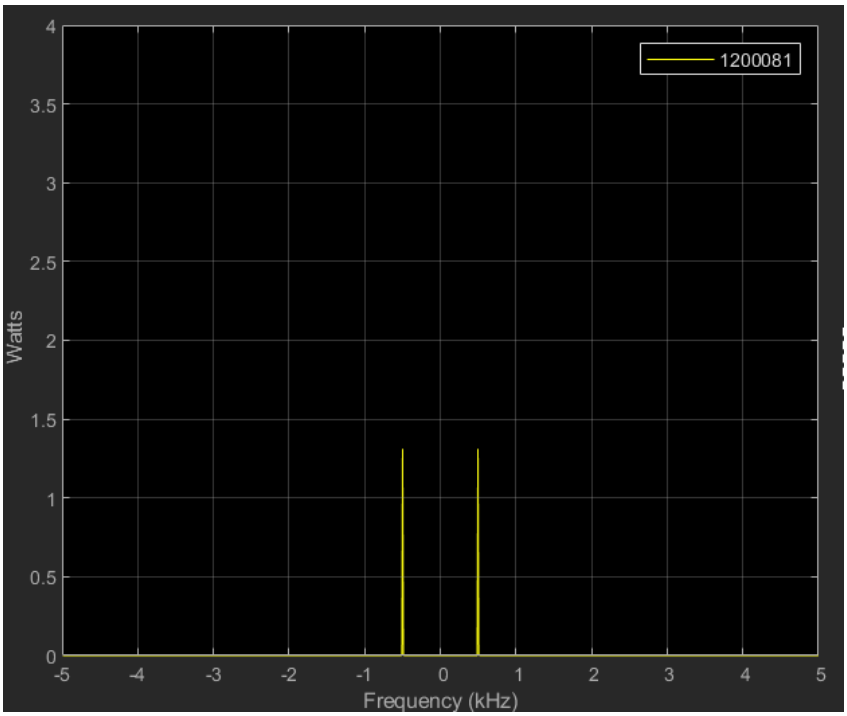


Figure 32.demodulated signal in frequency domain

4.3.De-Modulated signal Natural @ fm=500 & D=10%

Time domain:

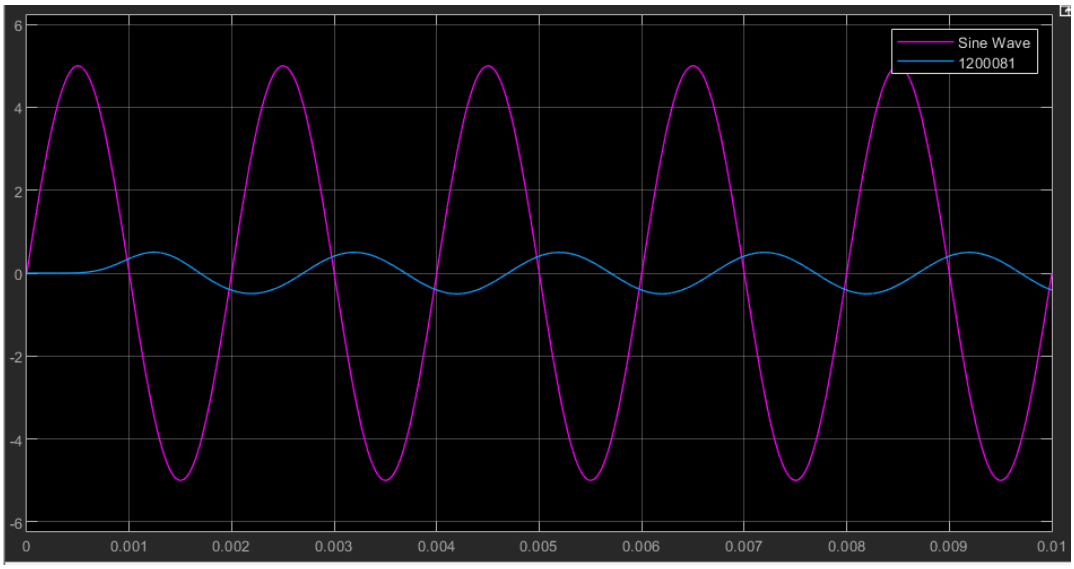


Figure 33.m(t) & demodulated signal in time domain at d=10%

Frequency domain:

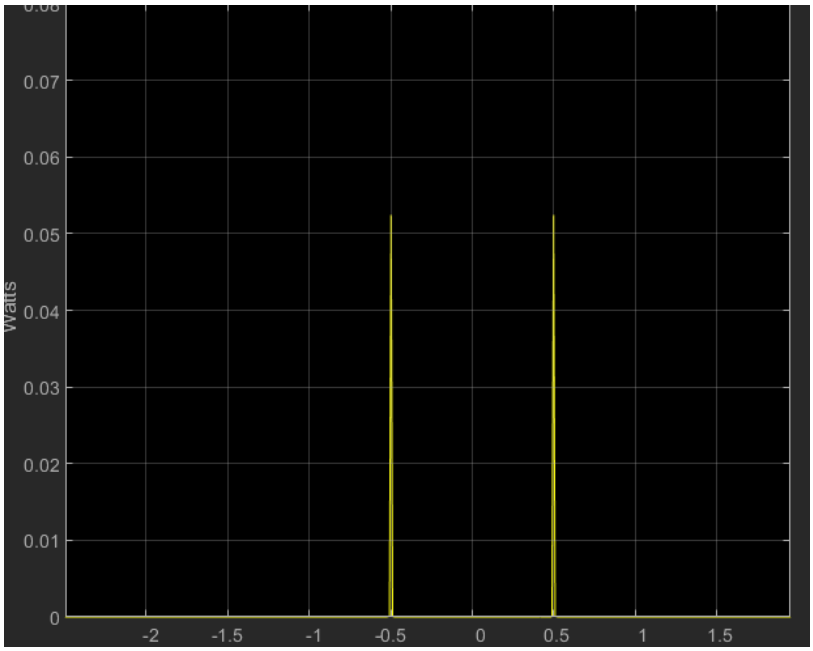


Figure 34.demodulated signal in frequency domain

4.4.De-Modulated signal Flat-Top @ fm=500 & D=50%:

Time domain:

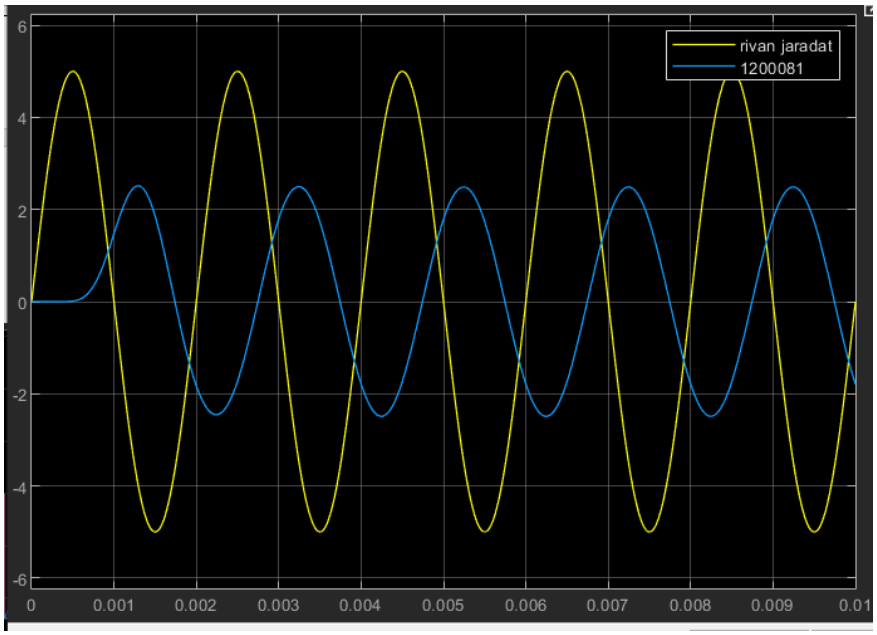


Figure 35.m(t) & demodulated signal in time domain at d=50%

Frequency domain:

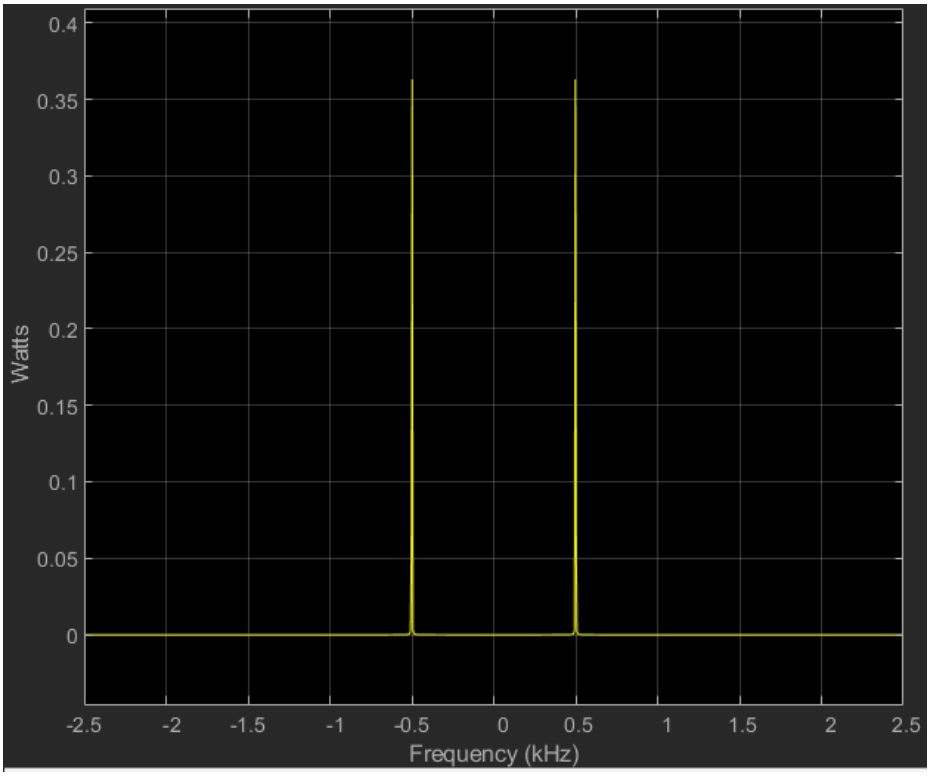


Figure 36.demodulated signal in frequency domain

5.Part 4:

5.1. Modulated signal @fm=3000 & D=50%

Time domain:

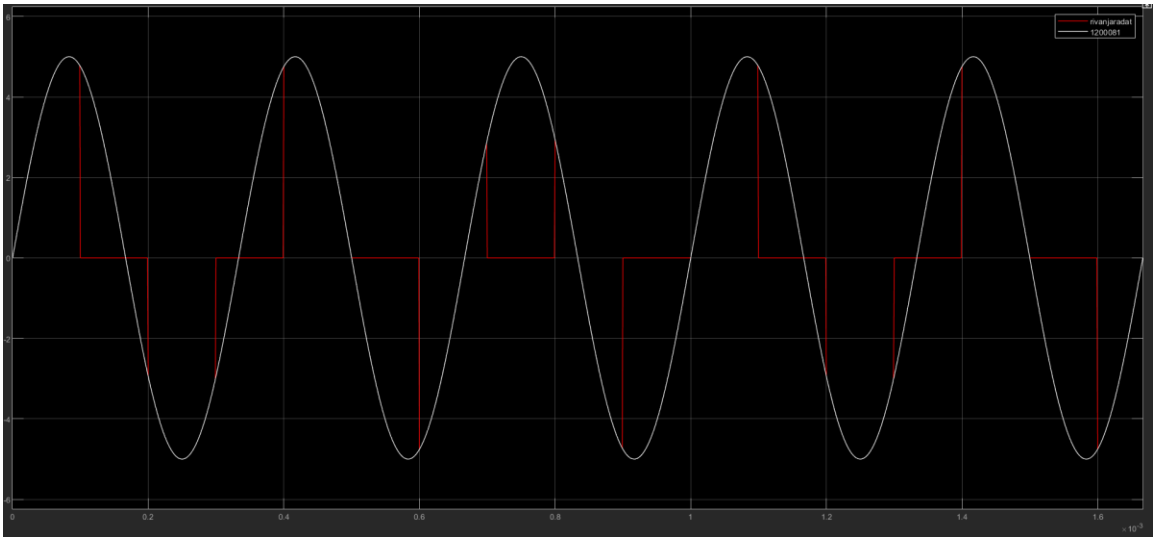


Figure 37.m(t) &Modulated signal @fm=3000 & D=50% in time domain

Frequency domain:

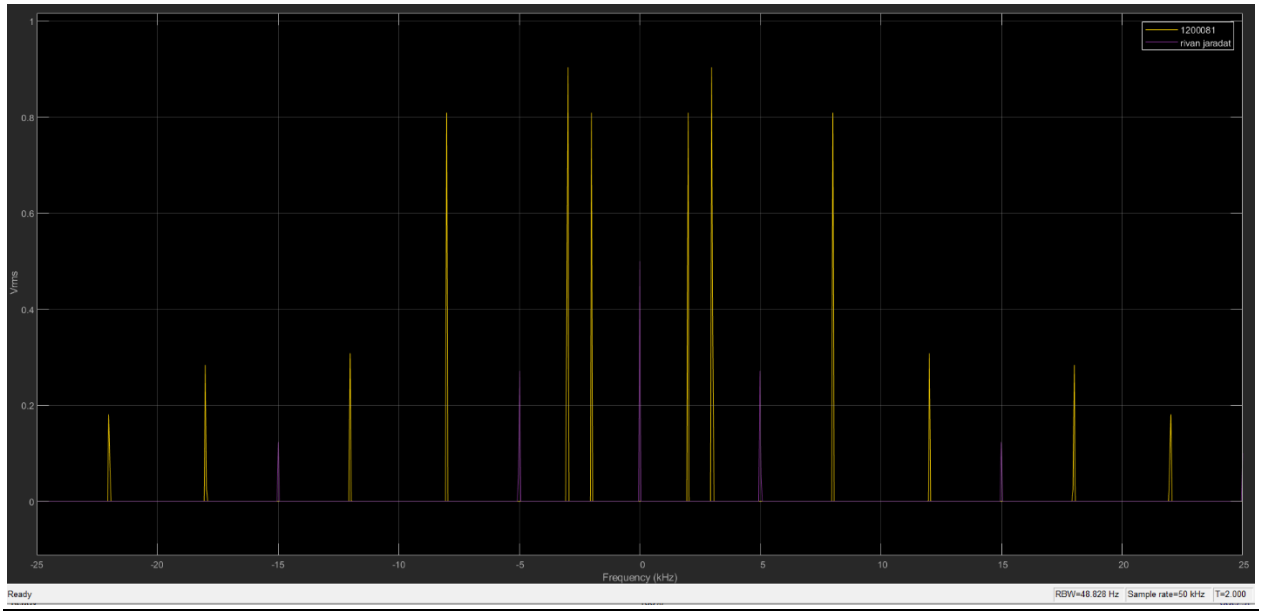


Figure 38.modulated signal in frequency domain

5.2.De-Modulated signal @fm=3000 & D=50%

Time:

Figure 39.m(t) &deModulated signal @fm=3000 & D=50% in time domain

Frequency :Domain:

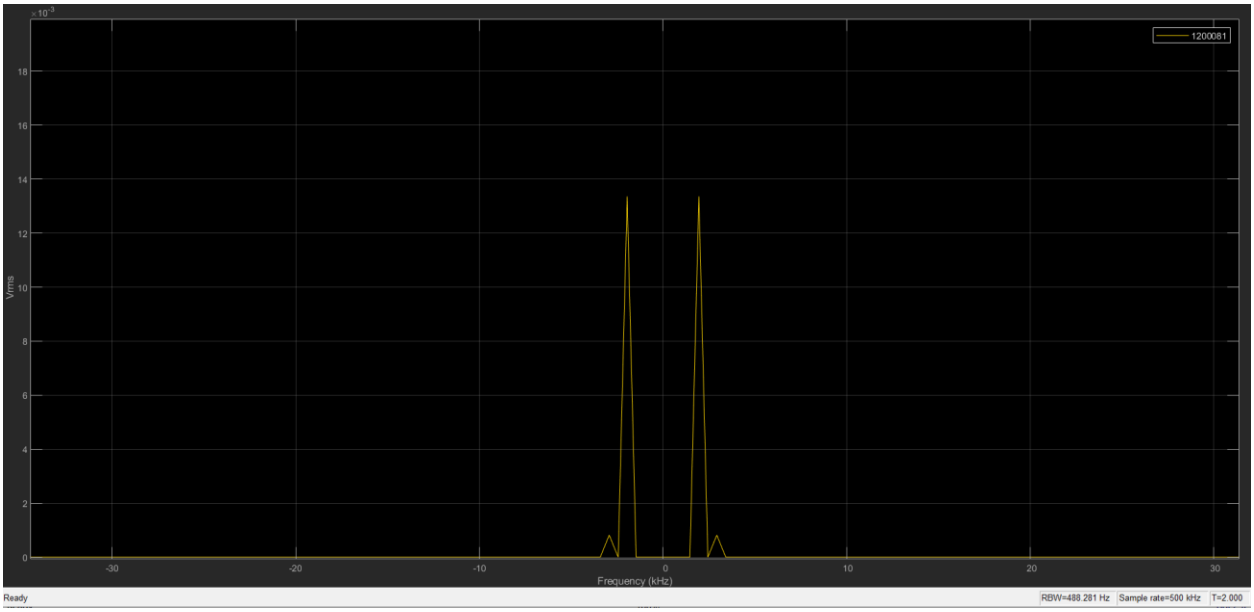


Figure 40.demodulated signal in frequency domain

Way 2: flat topped

5.3.Modulated signal @fm=3000 & D=50%

Time:

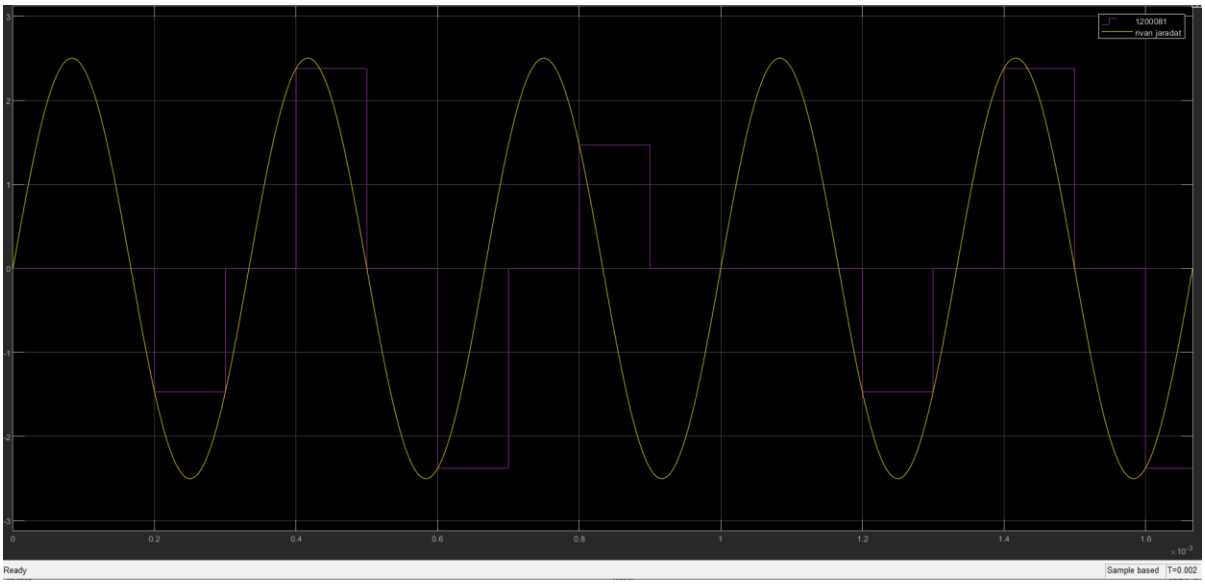


Figure 41m(t) &Modulated signal @fm=3000 & D=50% in time domain

Frequency Domain:

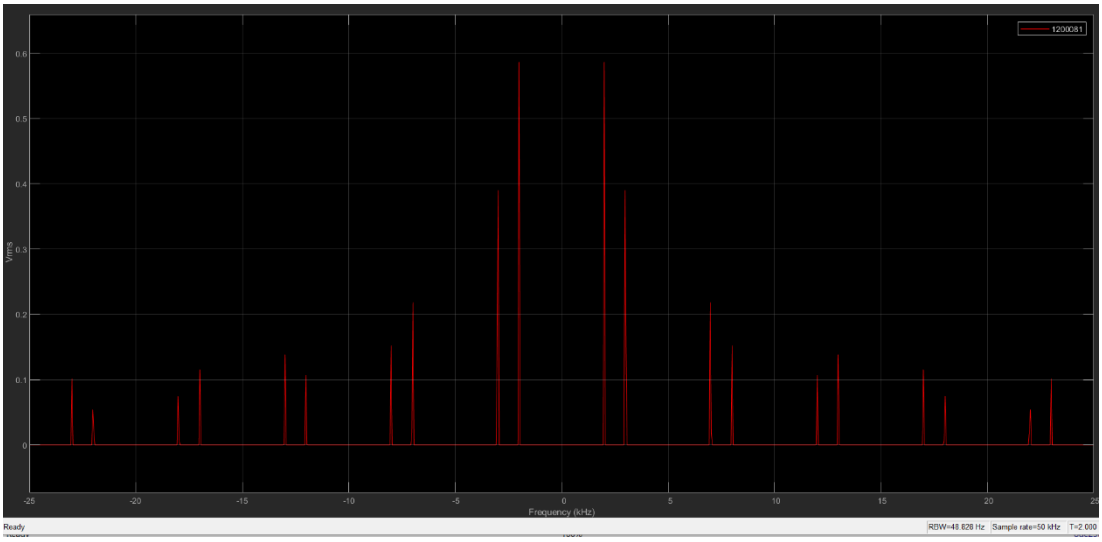


Figure 42.modulated signal in frequency domain

5.4.De-Modulated signal @fm=3000 & D=50%

Time domain:

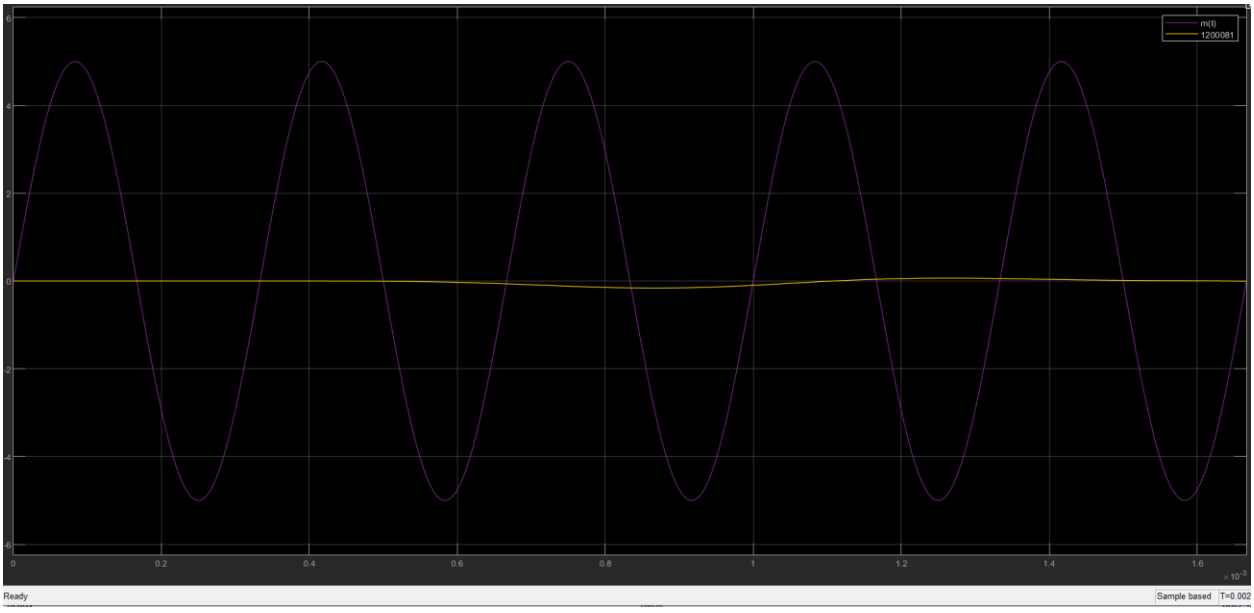


Figure 43.m(t) &de-Modulated signal @fm=3000 & D=50% in time domain

Frequency Domain:

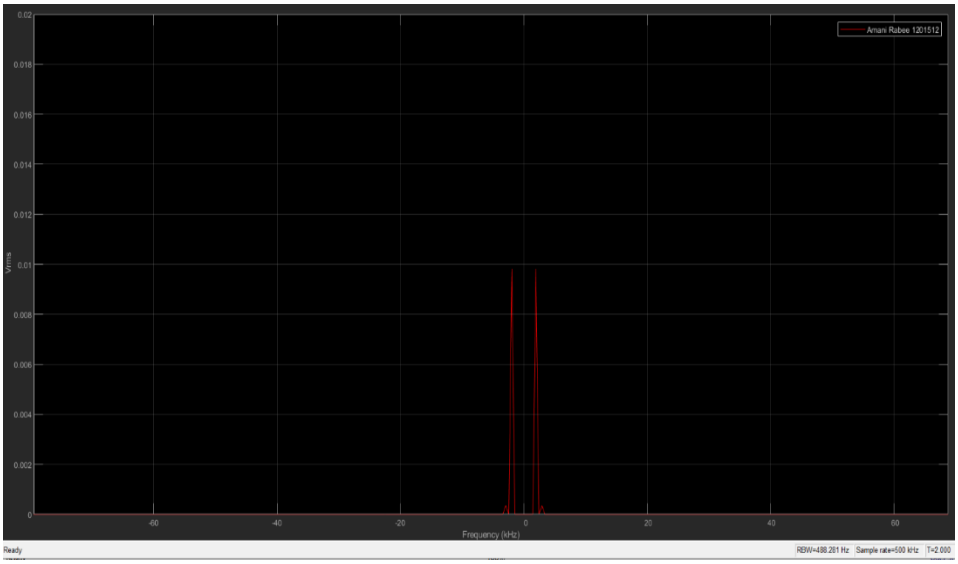
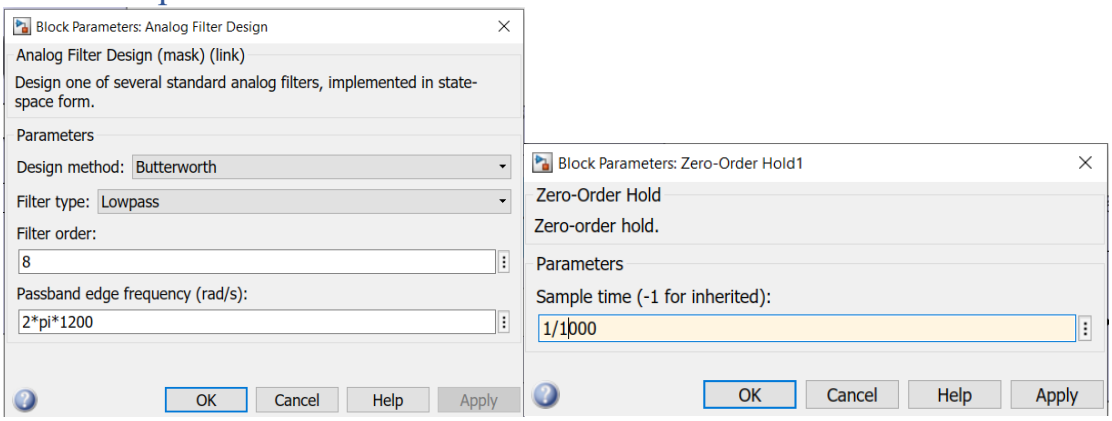


Figure 44.demodulated signal in frequency domain

6.General parameters:



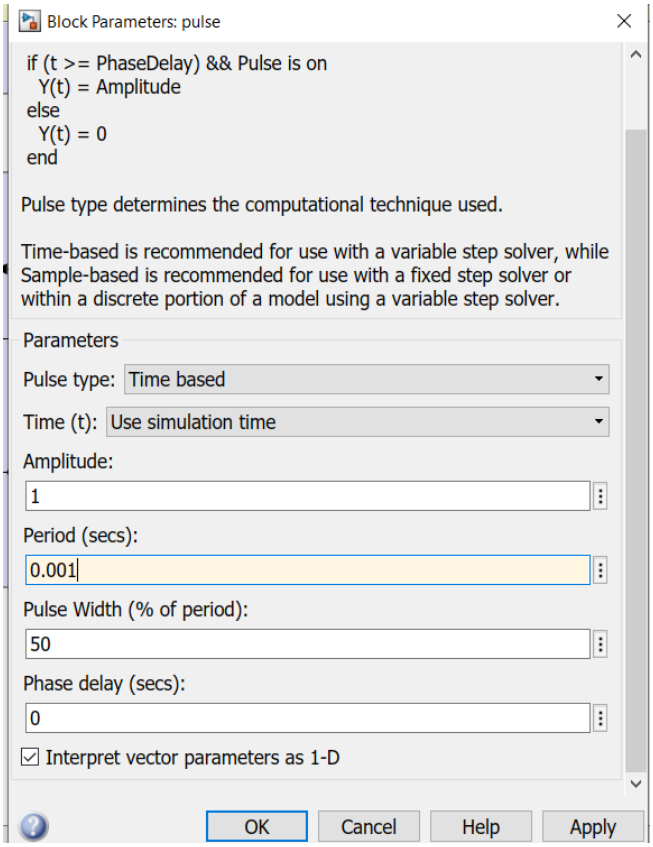


Figure 45.general parameter