Modulation and demodulation of waves

Zając Michał

Amplitude Modulation and Demodulation

Algorithms

1. Modulation
- s_AM = s1*s2 + s2

2. Demodulation
- envelope determination of s_AM
- dividing the signal by the envelope

AM/FM Modulator

Signal type and parameters

modulating signal

Sine Wave

Amplitude (at + b)

a 2000

b 1

Frequency

f 2500

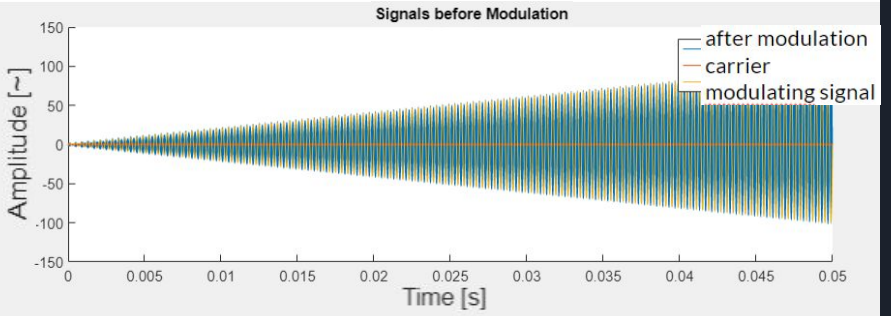
The frequency of the carrier signal

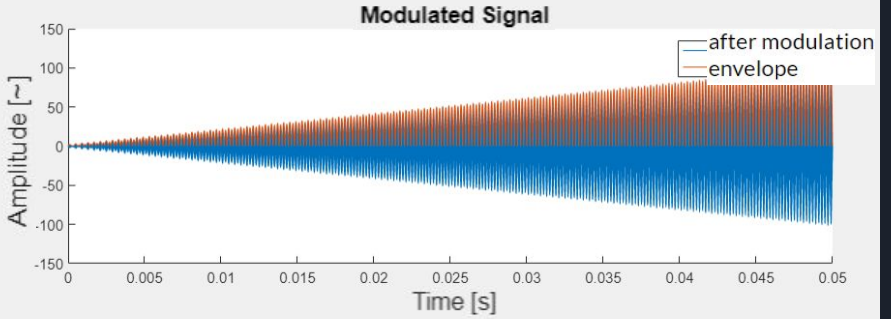
1e+05 1.9e+05 2.8e+05 3.7e+05 4.6e+05 5.5e+05 6.4e+05 7.3e+05 8.2e+05 9.1e+05 1e+06

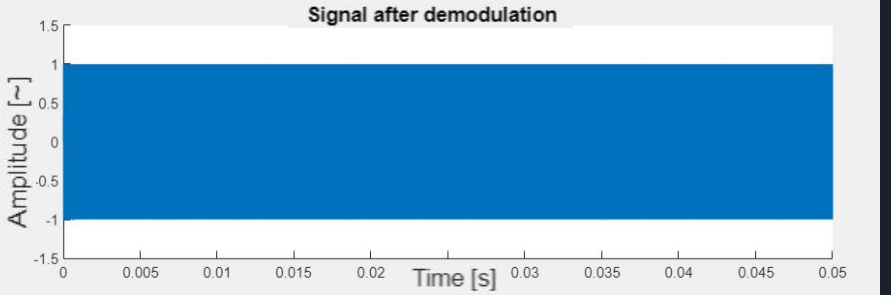
AM

FM

Zoom in







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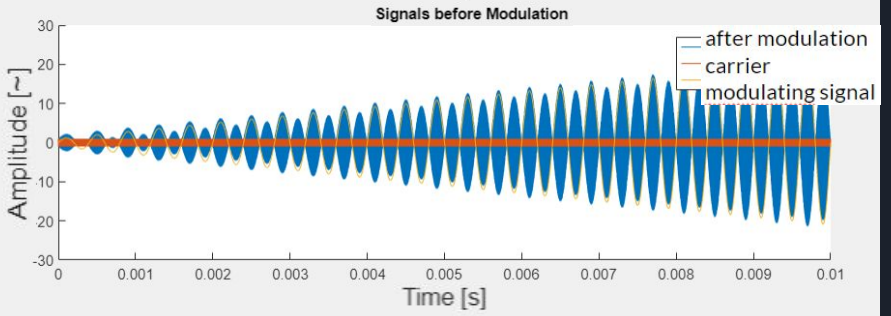

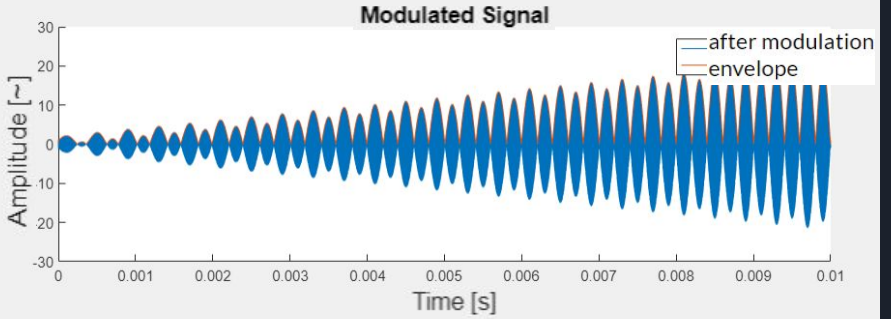

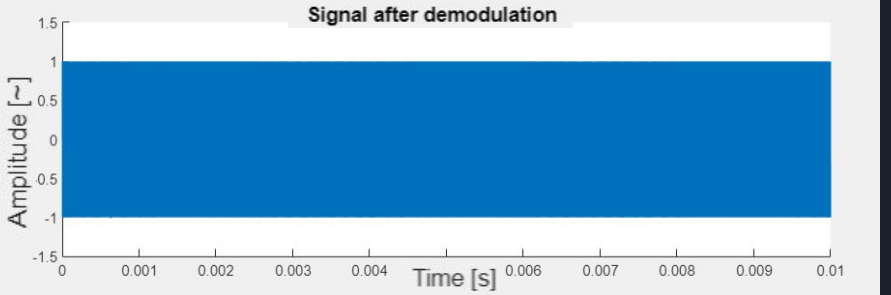

AM/FM Modulator

Signal type and parameters

modulating signal **Chirp**

Amplitude (at + b)

a -1000

b 1

Frequency

f 3000

The frequency of the carrier signal

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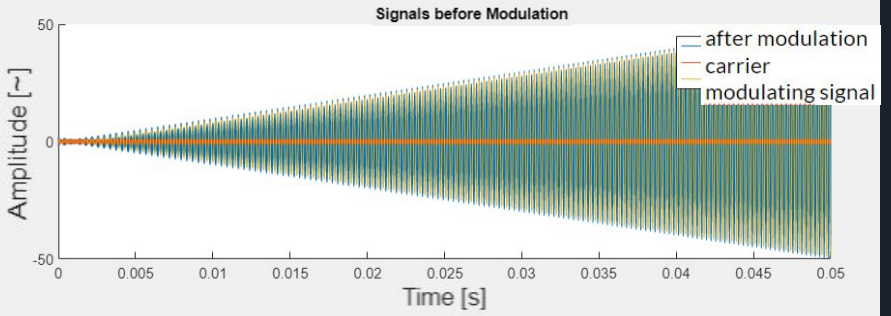
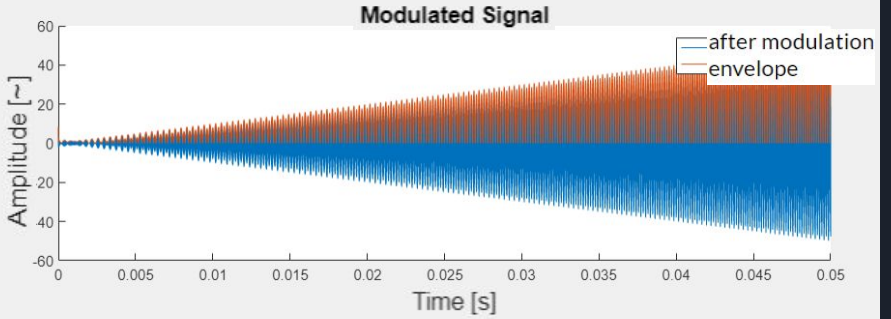
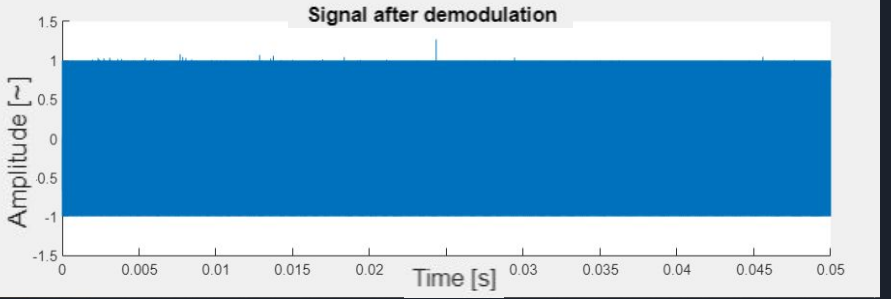
AM **FM**

Zoom in







AM/FM Modulator

Signal type and parameters

modulating signal **Chirp**

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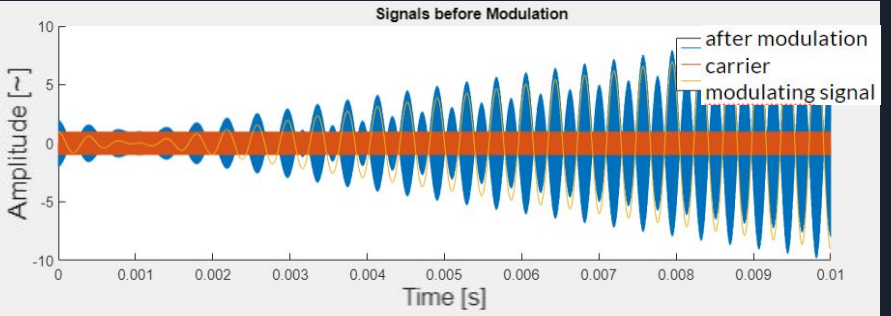
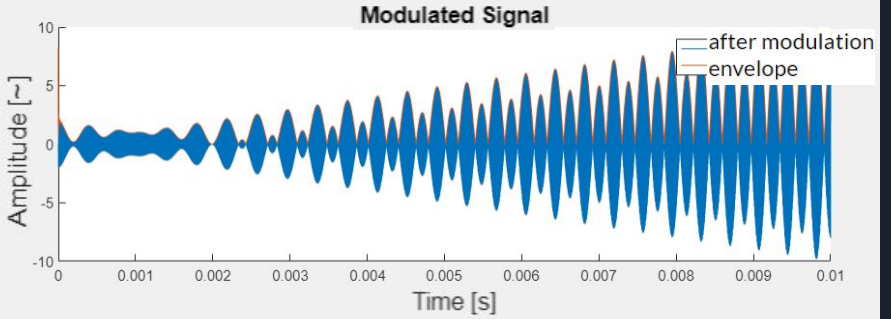
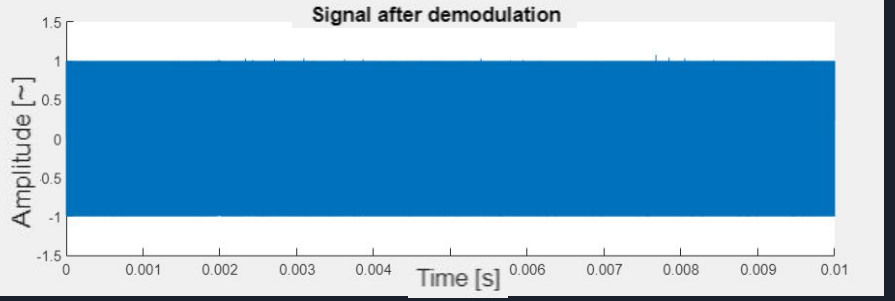
AM **FM**

Zoom in







AM/FM Modulator

Signal type and parameters

modulating signal

White Noise

Amplitude (at + b)

a 200

b 5

Frequency

f 9000

The frequency of the carrier signal

1e+05 1.9e+05 2.8e+05 3.7e+05 4.6e+05 5.5e+05 6.4e+05 7.3e+05 8.2e+05 9.1e+05 1e+06

AM

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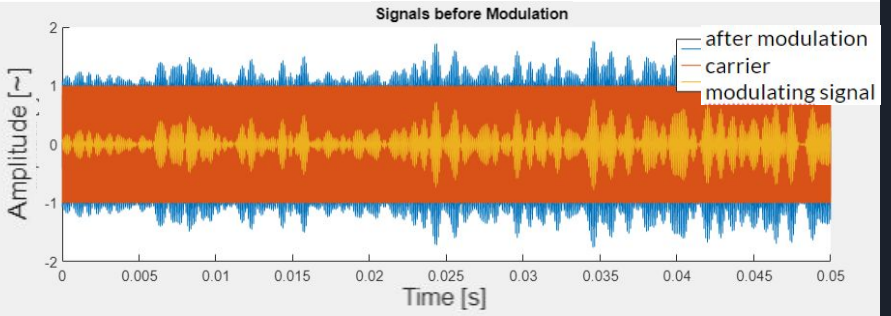

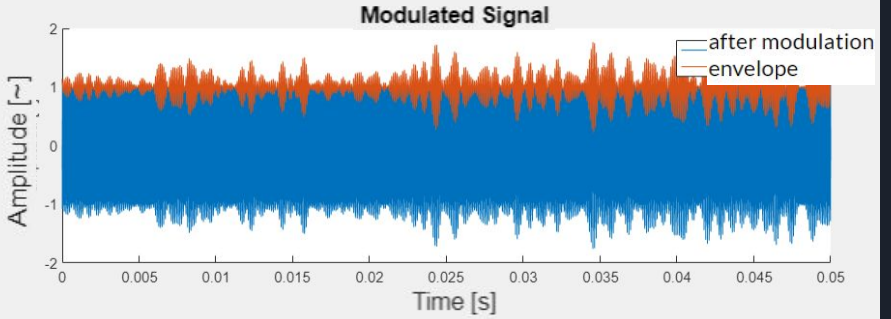

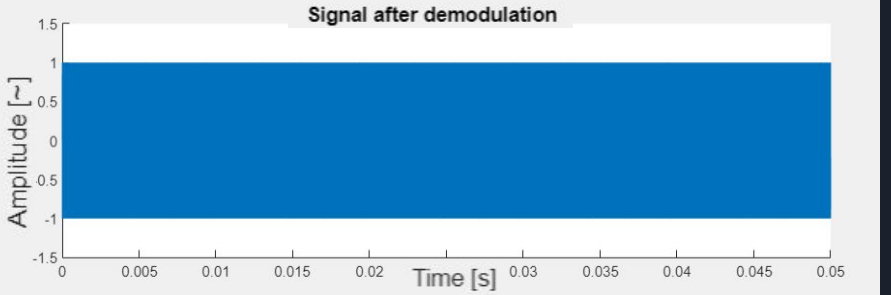

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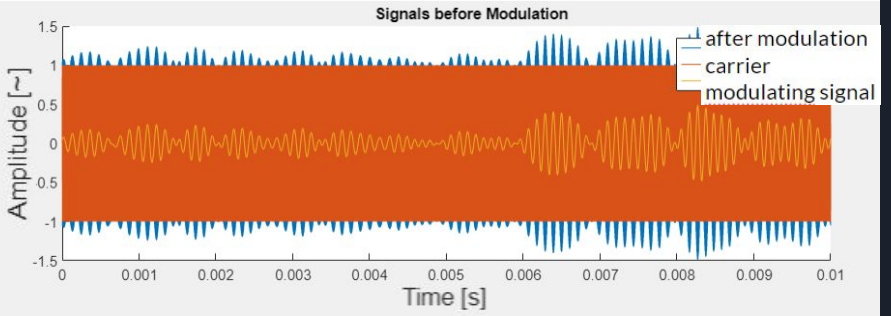

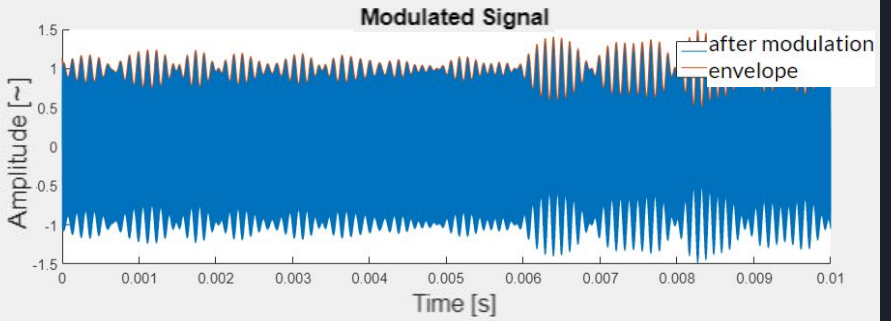

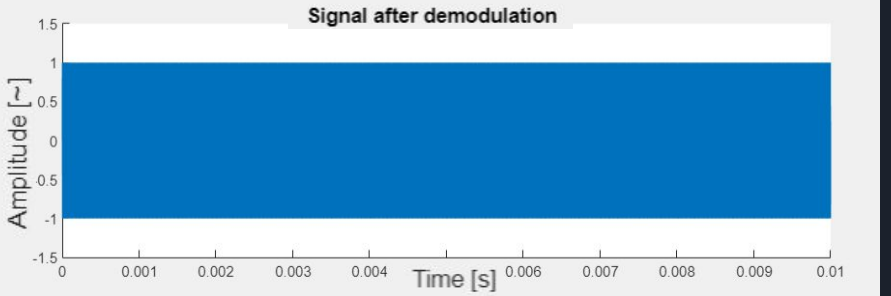

Frequency Modulation and Demodulation

Algorithms

1. Modulation
- s_FM= sin(2*pi*fc*t+s1)

2. Demodulation
- time differentiation
- calculation of the envelope, its filtration and removal of the constant component
- integral

AM/FM Modulator

Signal type and parameters

modulating signal

Sine Wave

Amplitude (at + b)

a 0

b 1

Frequency

f 3000

The frequency of the carrier signal

1e+05 1.9e+05 2.8e+05 3.7e+05 4.6e+05 5.5e+05 6.4e+05 7.3e+05 8.2e+05 9.1e+05 1e+06

AM

FM

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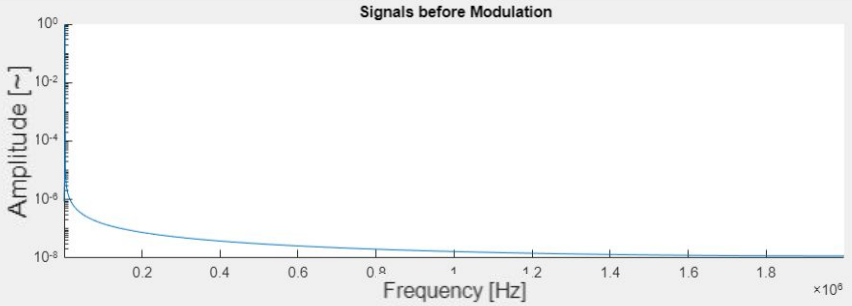

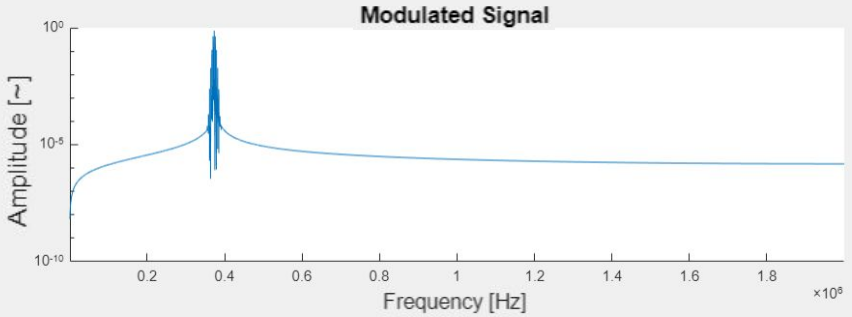

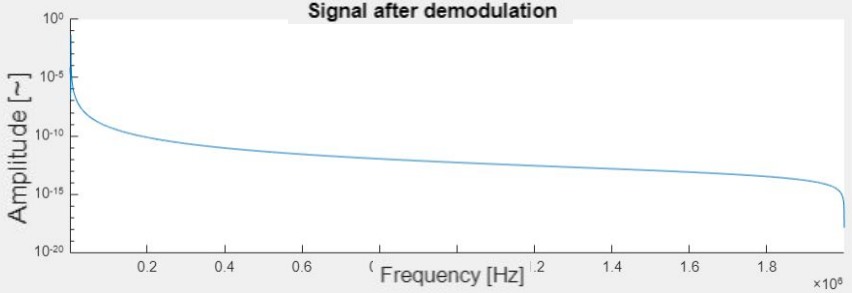

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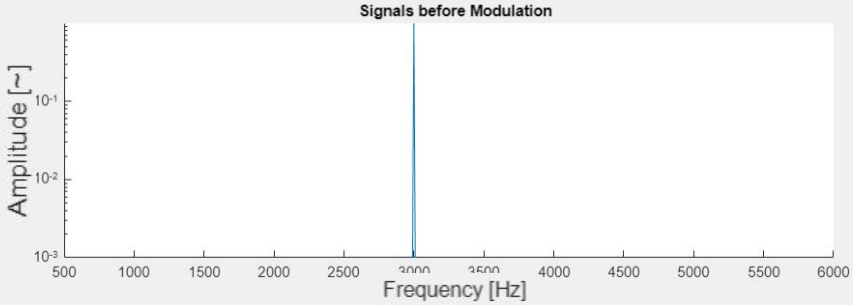

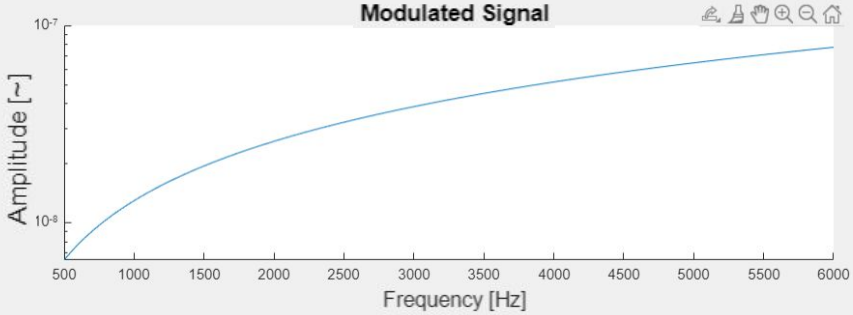

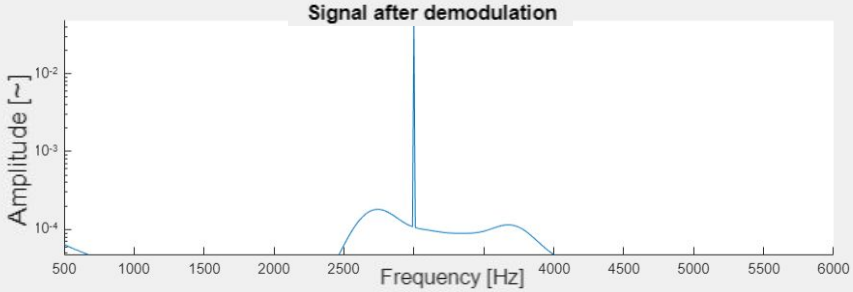

AM/FM Modulator

Signal type and parameters

modulating signal

Chirp

Amplitude (at + b)

a 0

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Frequency

f 5000

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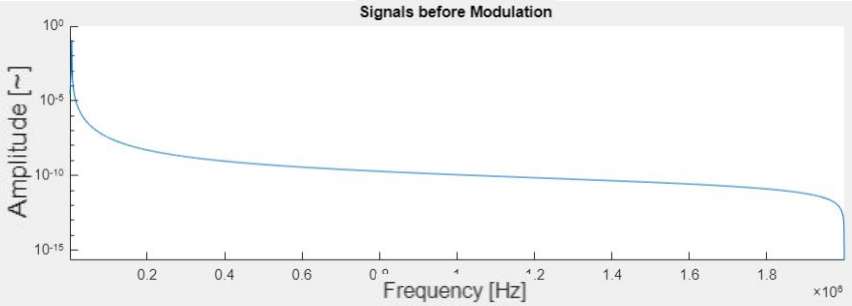

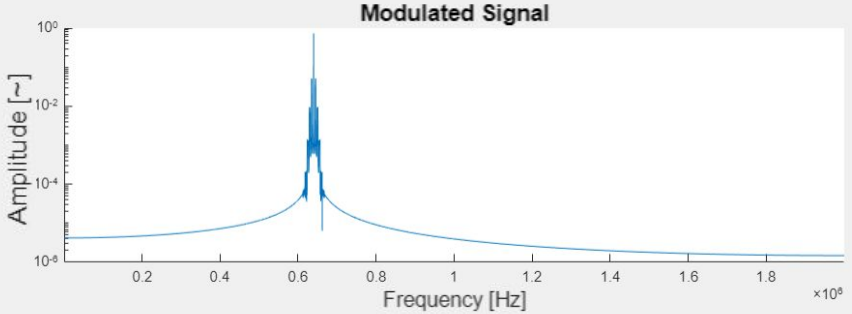

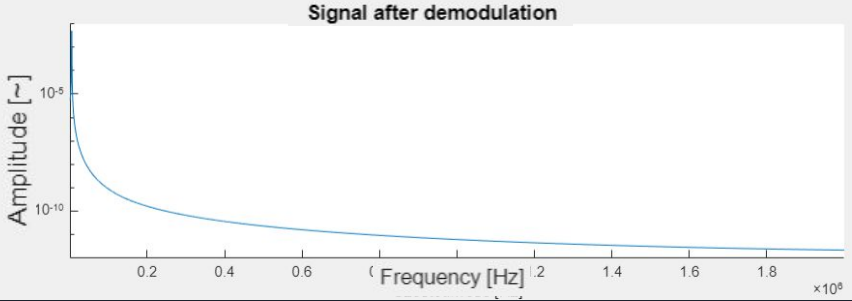

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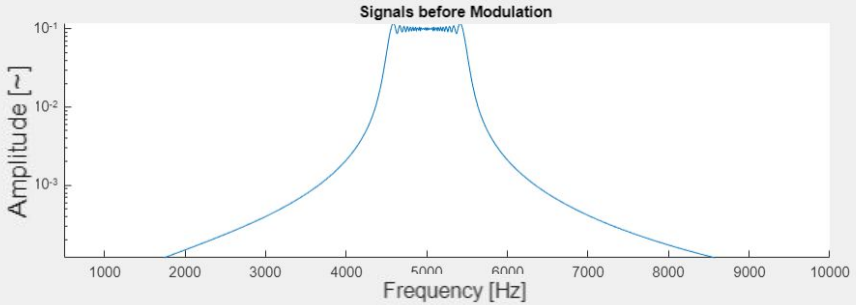

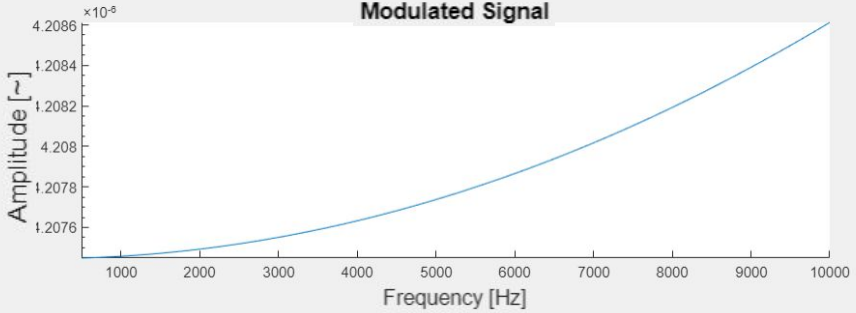

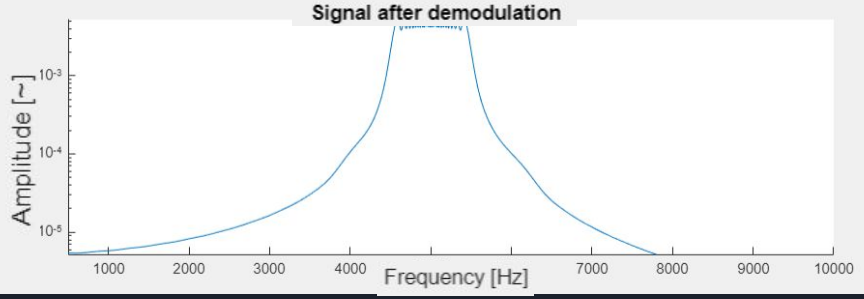

AM/FM Modulator

Signal type and parameters

modulating signal

White Noise

Amplitude (at + b)

a 0

b 1

Frequency

f 7500

The frequency of the carrier signal

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AM

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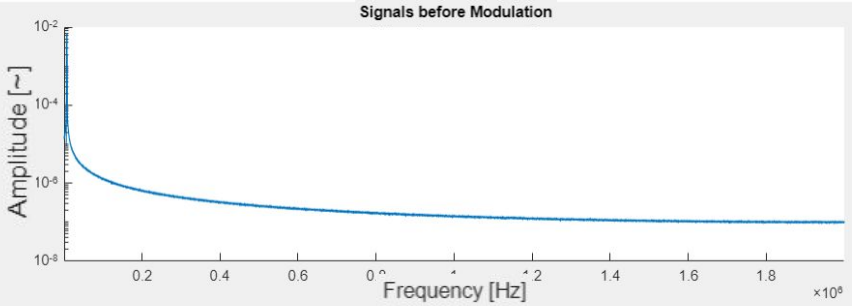

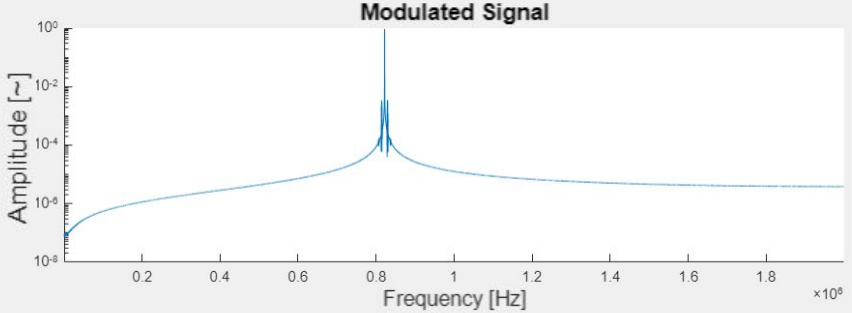

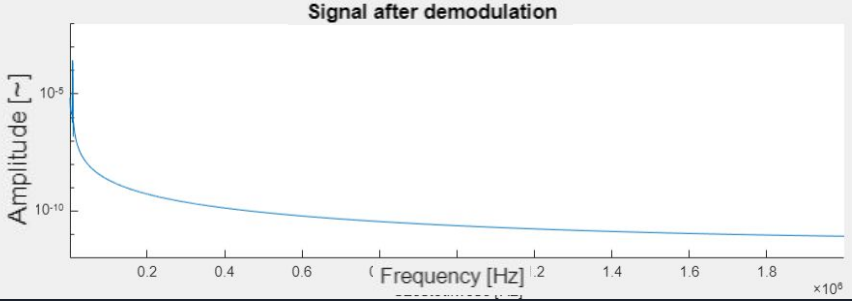

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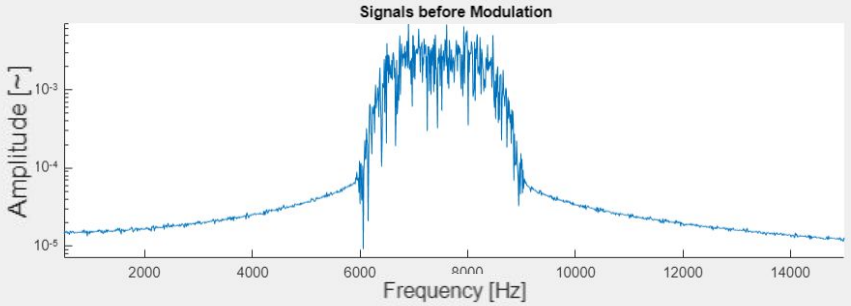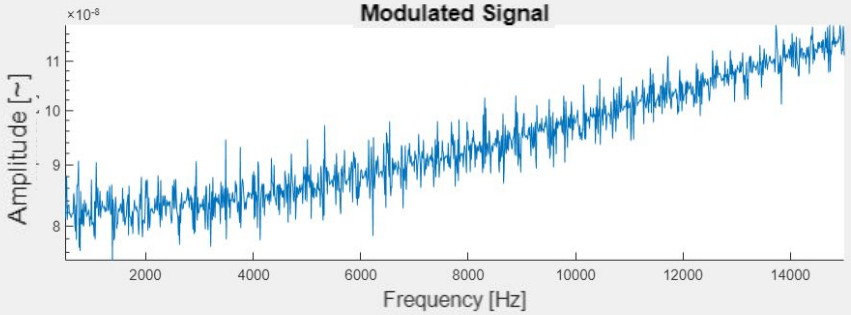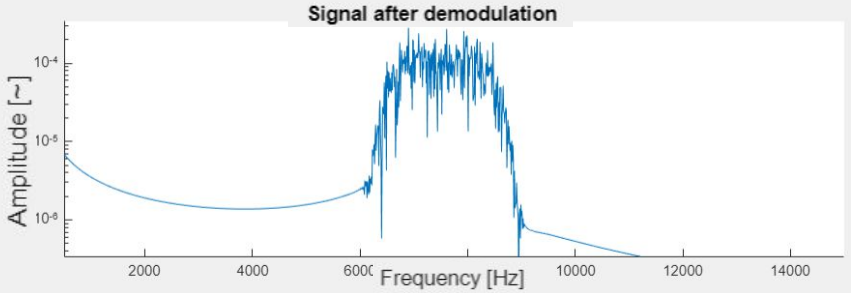
Zoom in