Faculty of Engineering & Technology
Department of Electrical & Computer Engineering
ENEE4113-COMMUNICATIONS LAB
Exp 1: Normal Am
Pre Lab #1

Prepared by:
Saja Asfour   1210737

Instructor:
Dr. Qadri Mayyala
Assistance:
Eng.Mohammad Al-Battat
Section:
Sec 5

Date:
21/7/2024

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Block simulation

For time domain I set the step time to 5/1000 , and in spectrum I set it to 1

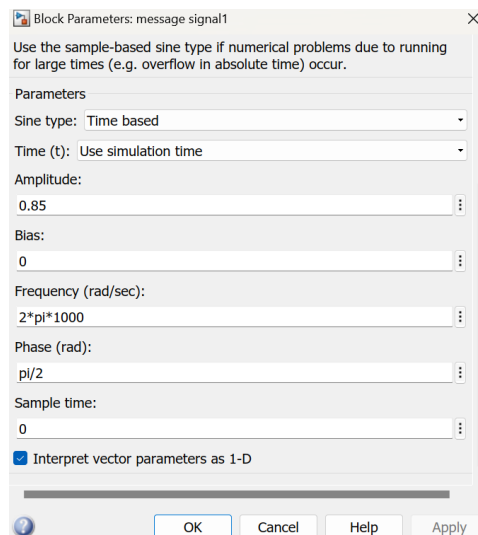## A-Modulation Schematic diagram

M(t) = 0.85 cos(2 π (1000)t)

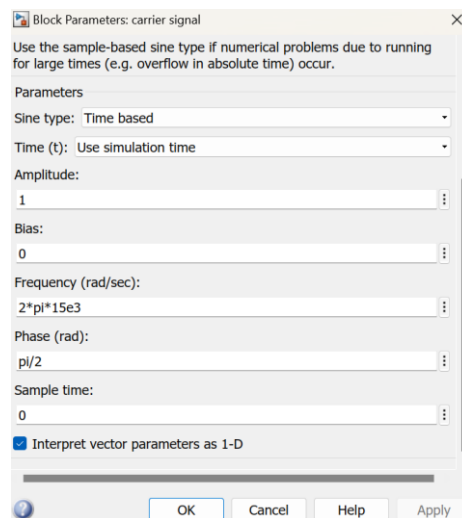**Figure1 : Block parameter for m(t)**

C(t) = 1 cos (2 π (15000)t)

Figure2 :Block parameter for c(t)

If we have modulation index (u) equal 1 :

u = k Am → 1 = k (0.85) → k= $\frac{1}{0.85}$

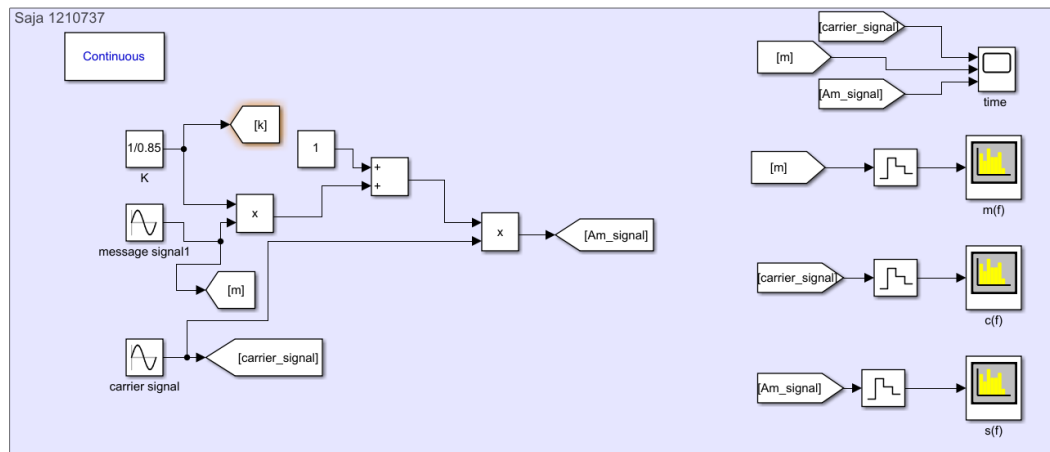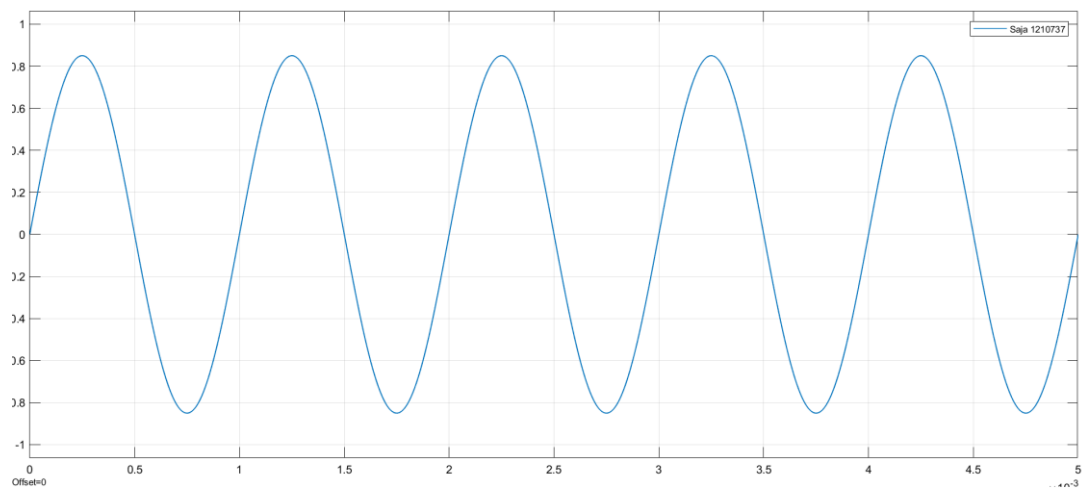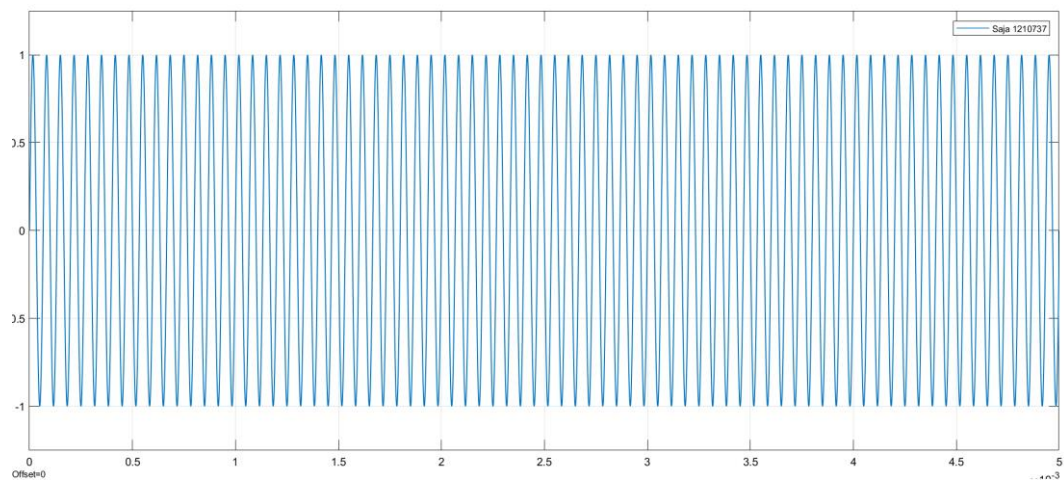**Figure3 :Modulation Schematic**

Figure4 : meesage signal

Figure 5: carrier signal
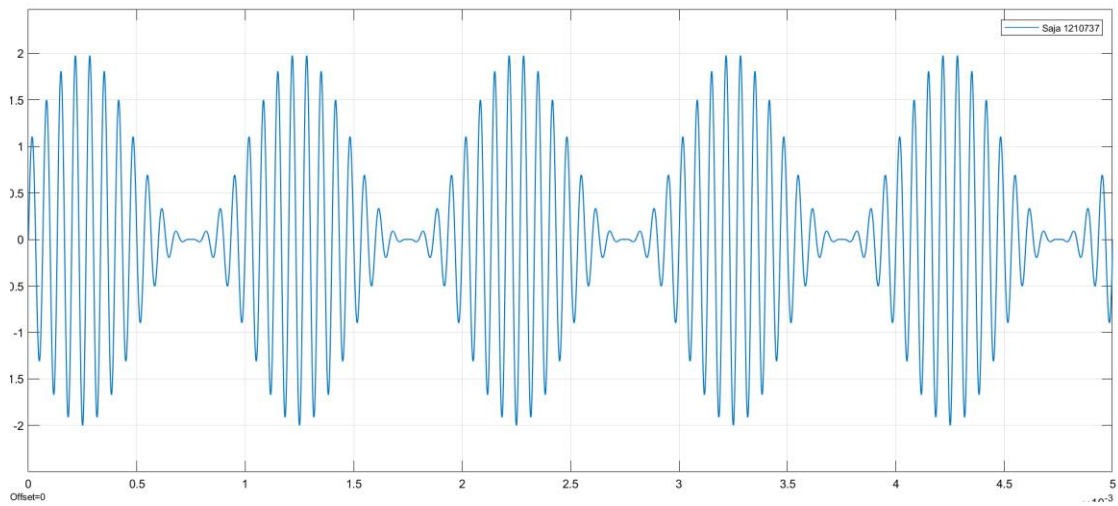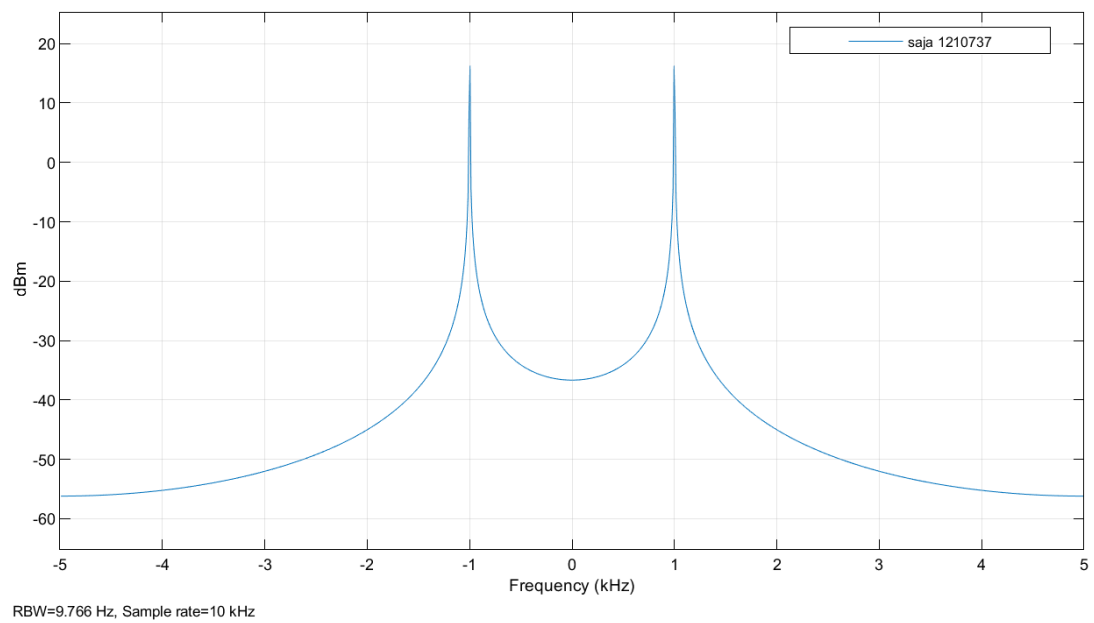
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Figure 6: modulated signal(u=1)

RBW=9.766 Hz, Sample rate=10 kHz

Figure7 : Spectrum for message signal

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RBW=146.484 Hz, Sample rate=150 kHz
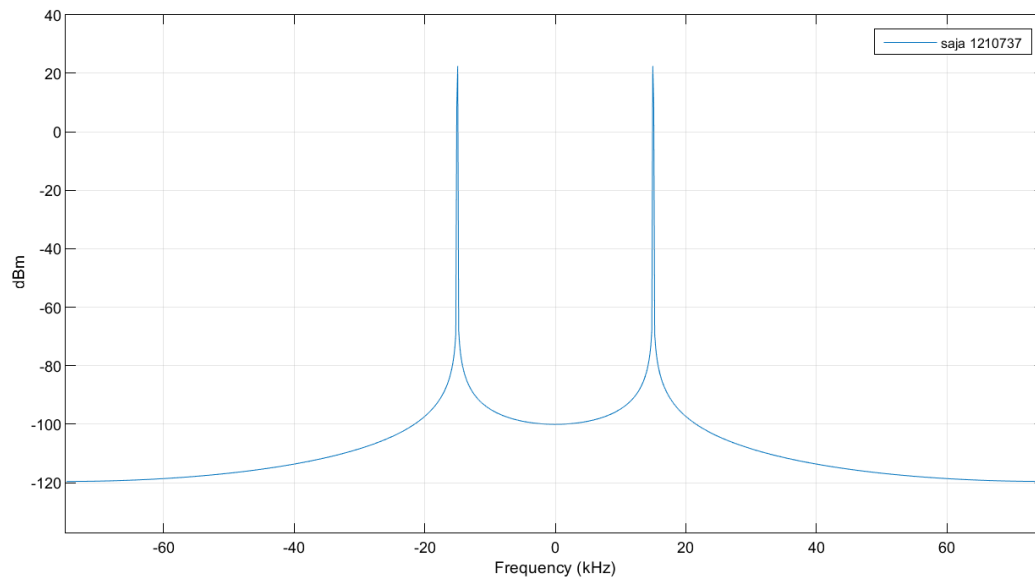
Figure8 : Spectrum for carrier signal

RBW=146.484 Hz, Sample rate=150 kHz

Figure9 : Spectrum for modulated signal (u=1)

If we have modulation index (u) > 1 :

u = k Am $\rightarrow$ 2 = k (0.85) $\rightarrow$ k= $\frac{2}{0.85}$
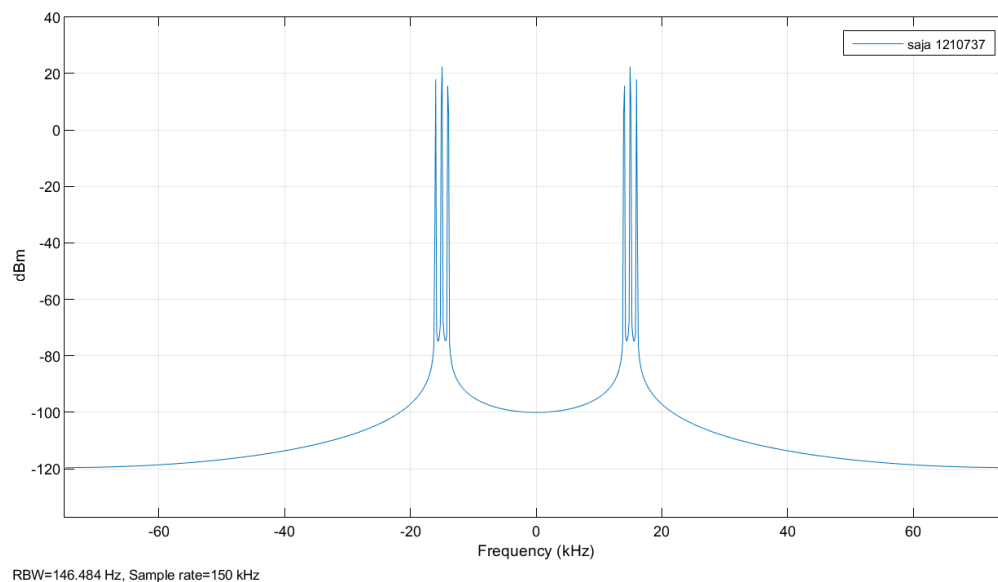
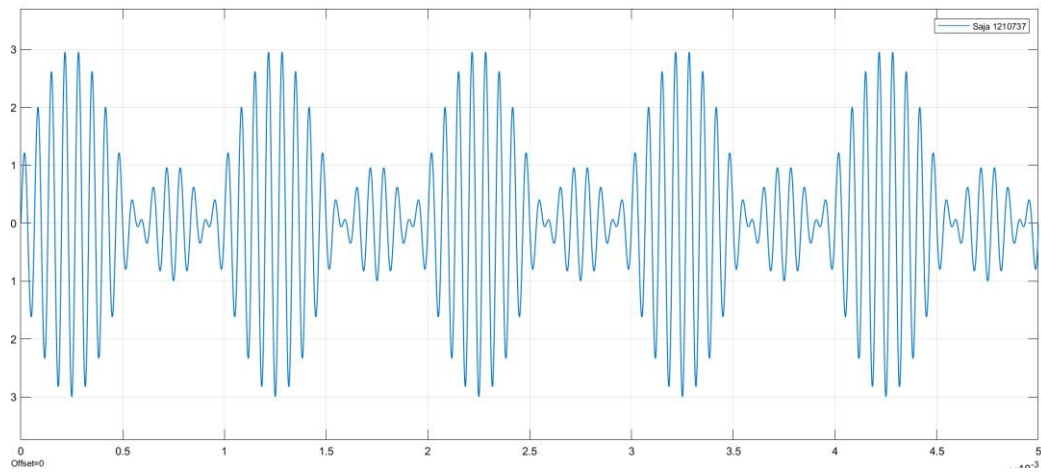I change k in the block diagram to $\frac{2}{0.85}$
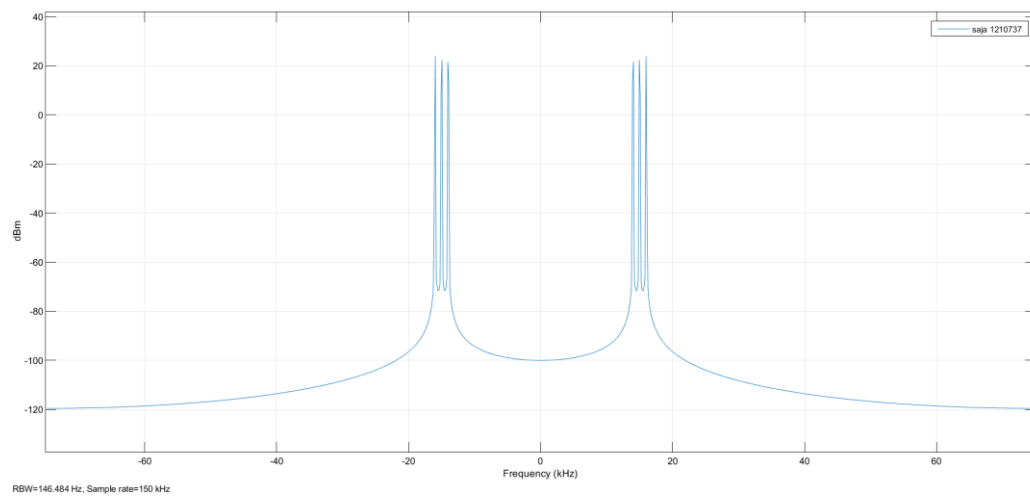
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Figure10 : modulated signal(u>1)

Figure 11: Spectrum for modulated signal (u>1)

If we have modulation index (u) <1 :

u = k Am → 0.5 = k (0.85) → k= $\frac{0.5}{0.85}$
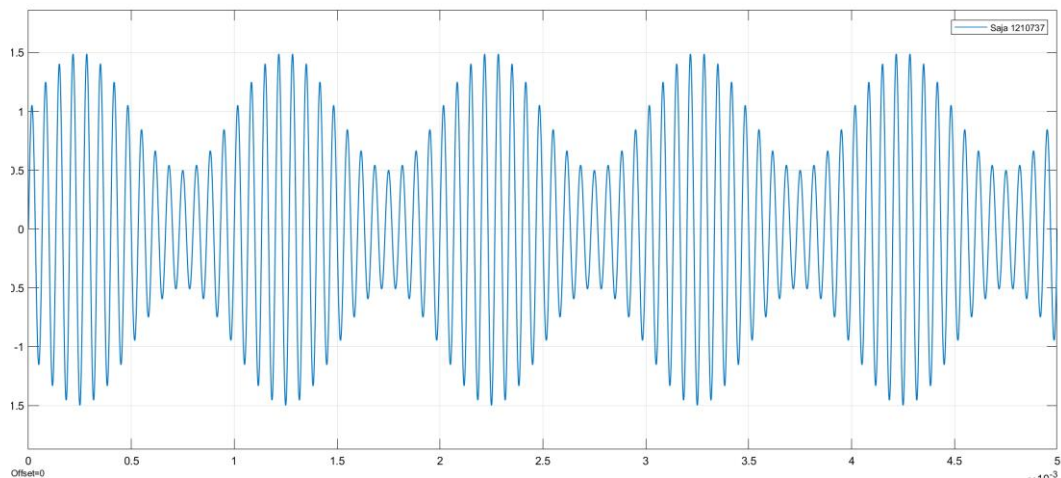
I change k in the block diagram to $\frac{0.5}{0.85}$

Figure 12: modulated signal(u<1)

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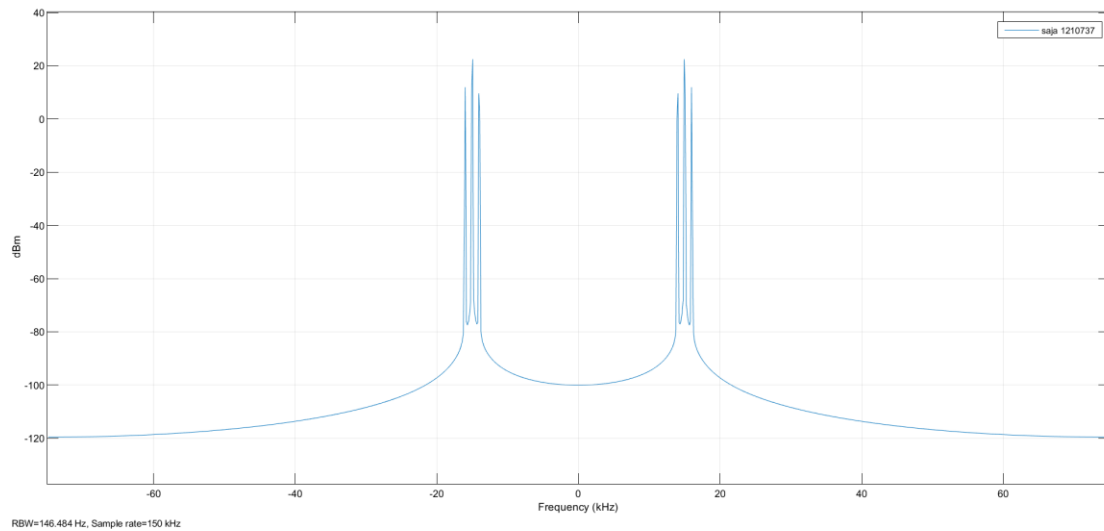**Figure 13: Spectrum for modulated signal (u<1)**
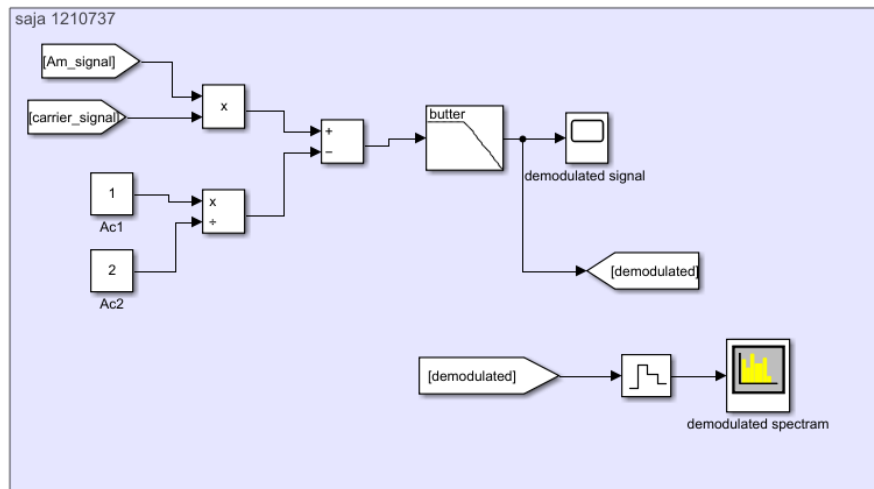
B-Coherent Demodulation
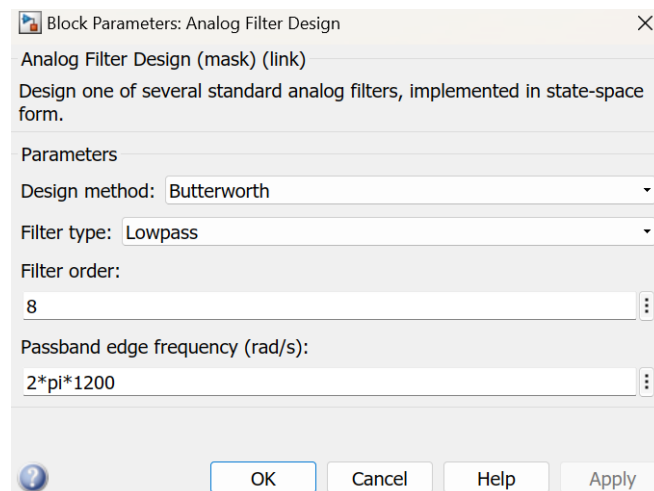

Figure 14: Coherent Demodulation block diagram

Figure 15: Block parameters for analog filter design

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Figure 16: Demodulated Signal using Coherent demodulation if (u=1)

RBW=9.766 Hz, Sample rate=10 kHz

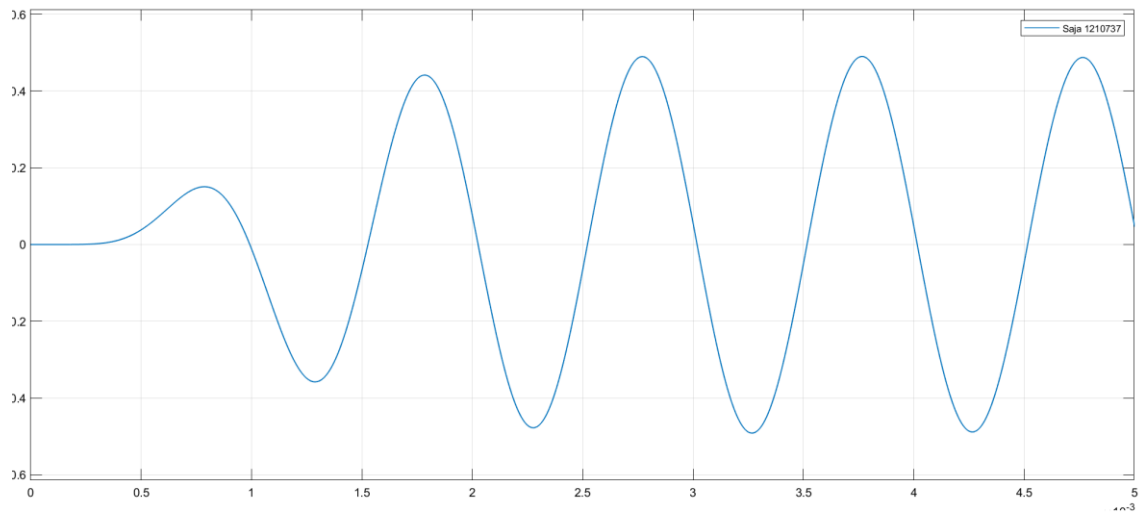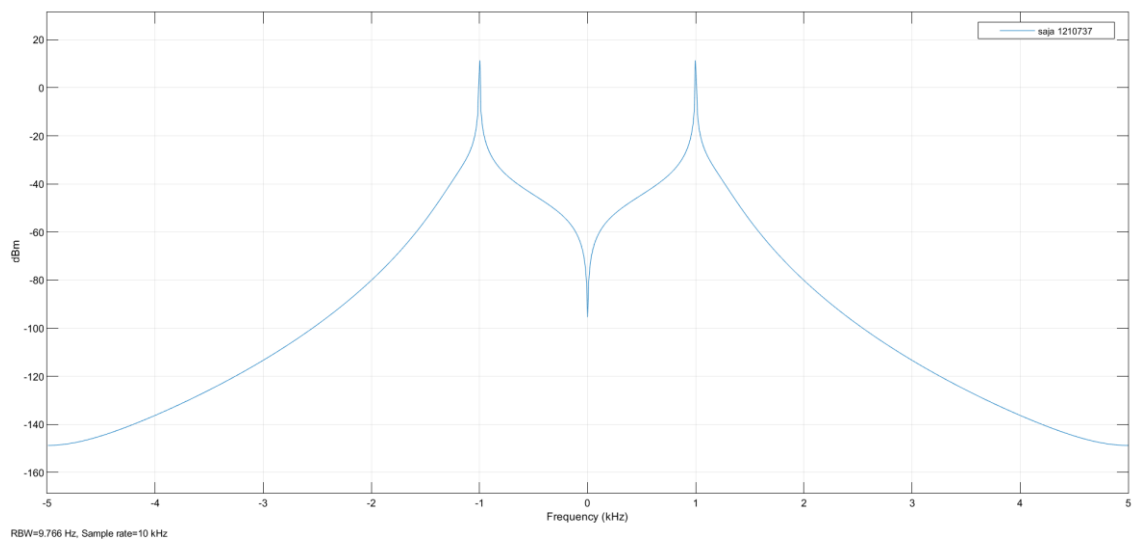**Figure 17: spectram for Demodulated Signal using Coherent demodulation if (u=1)**

Figure 18:Demodulated Signal using Coherent demodulation if (u<1)

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Figure 19: spectram for Demodulated Signal using Coherent demodulation if (u<1)

Figure 20: Demodulated Signal using Coherent demodulation if (u>1)

Figure 21: spectram for Demodulated Signal using Coherent demodulation if (u>1)
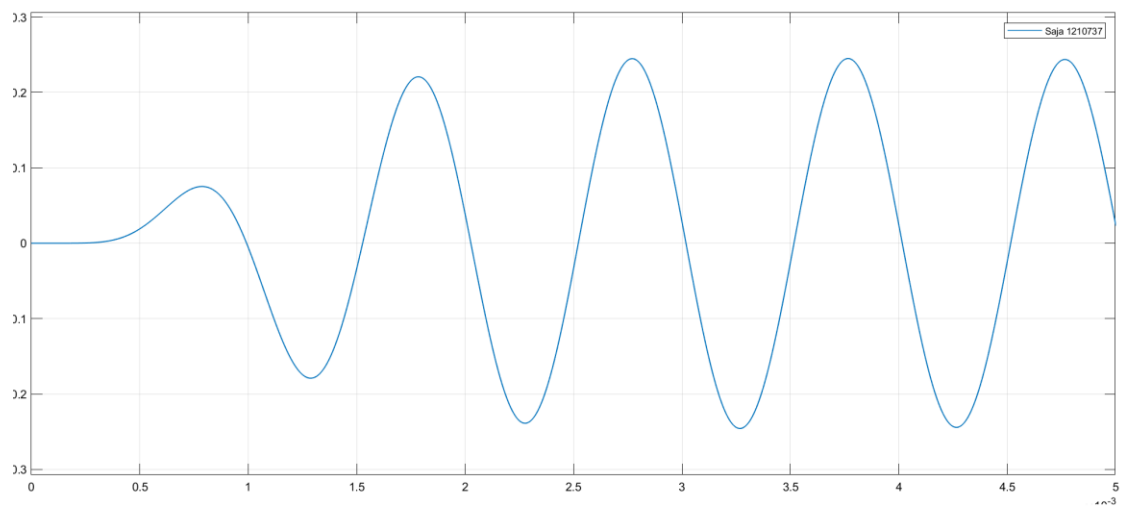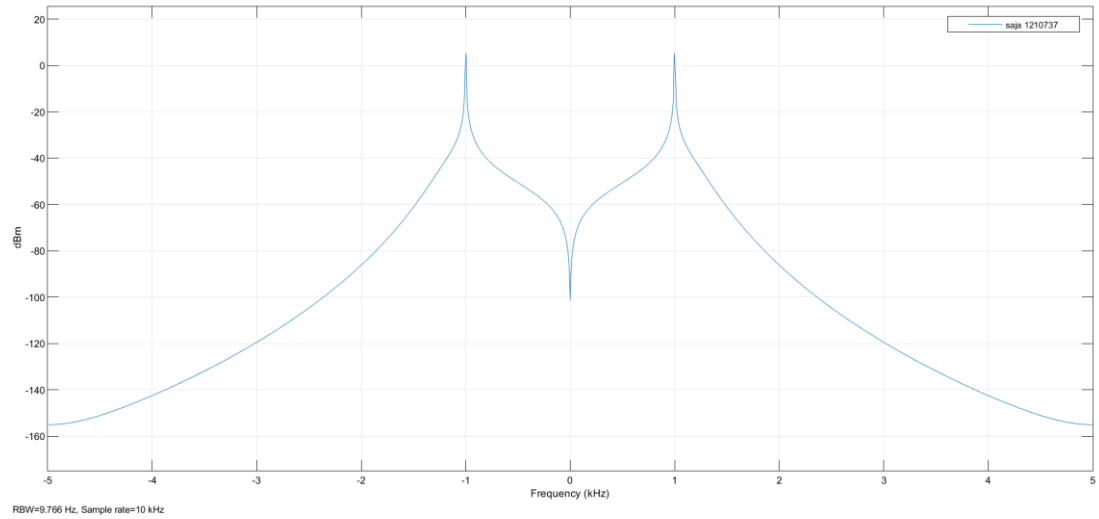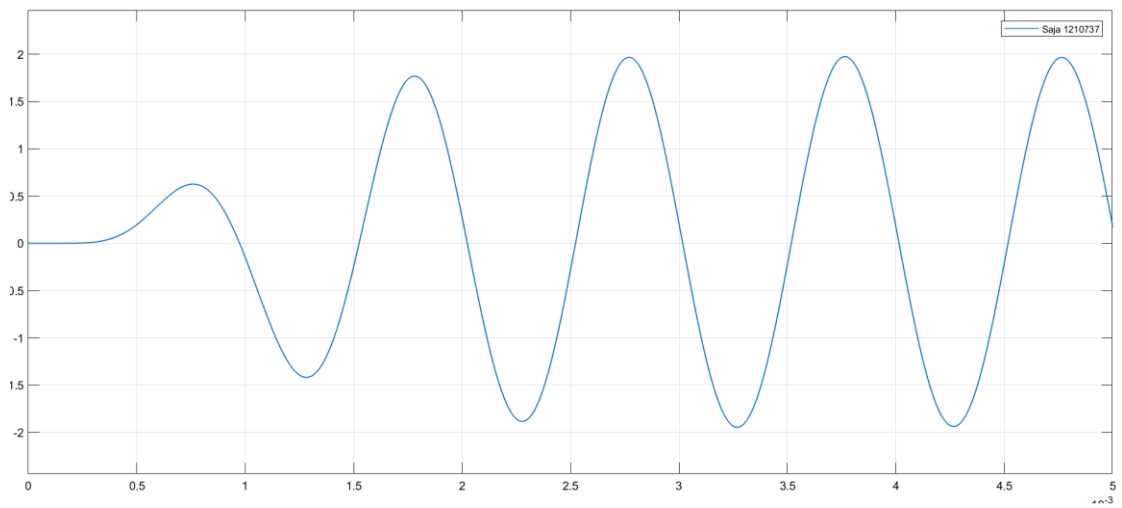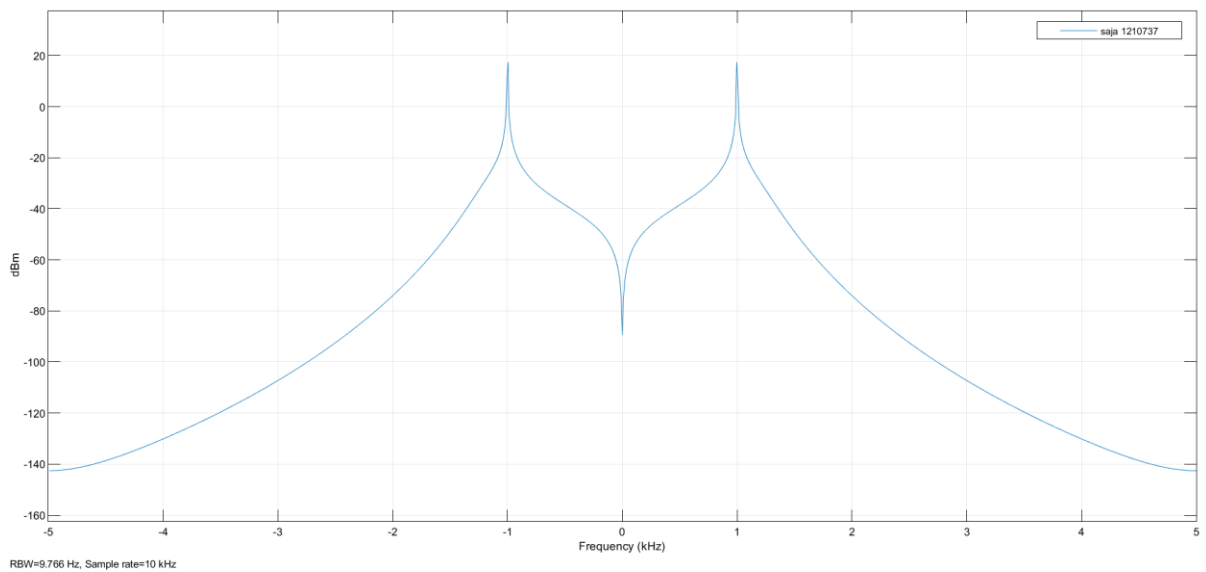
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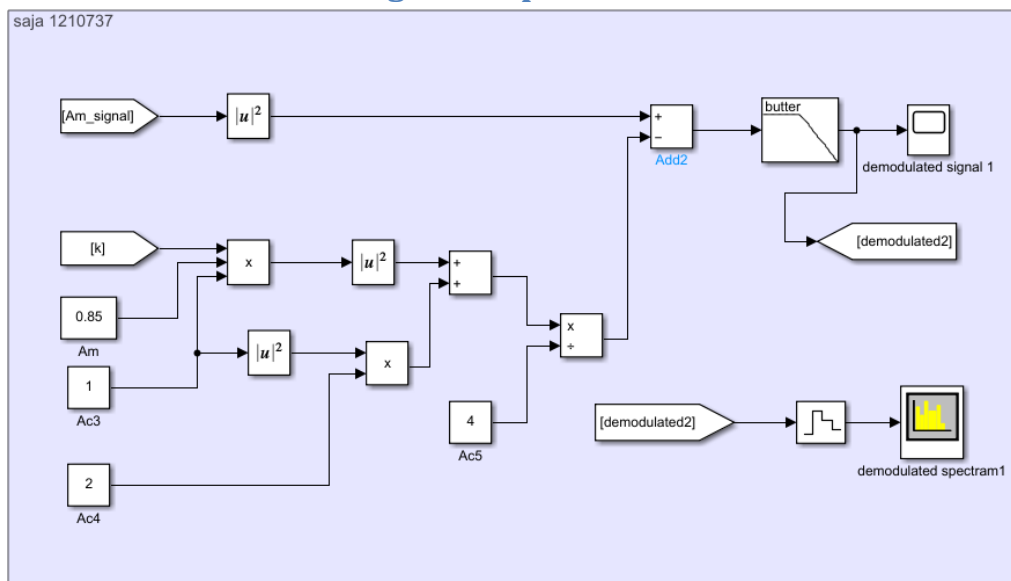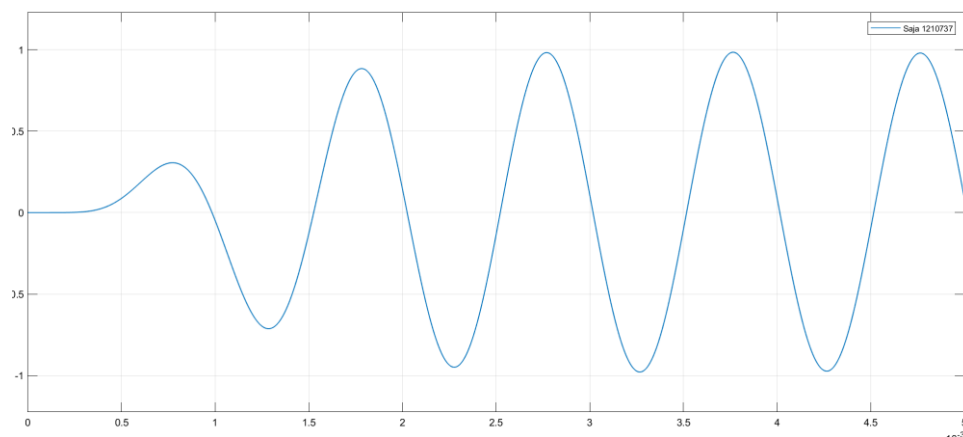## C- Demodulation Schema using Envelop detector

Figure 22: Envelop detector

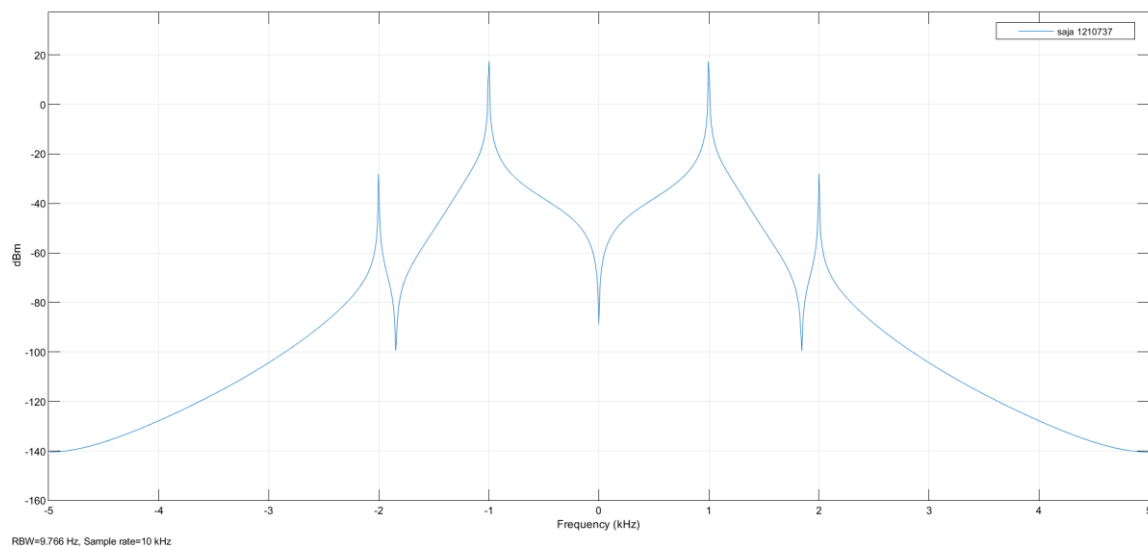**Figure 23: Demodulated Signal using Envelop detector if (u=1)**

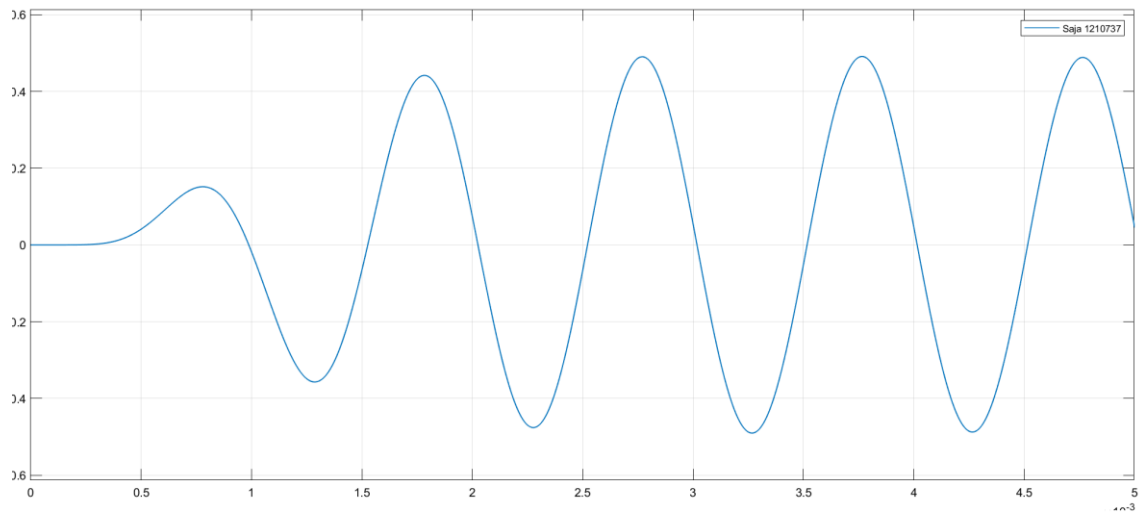**Figure 24: spectrum of Demodulated Signal using Envelop detector if (u=1)**

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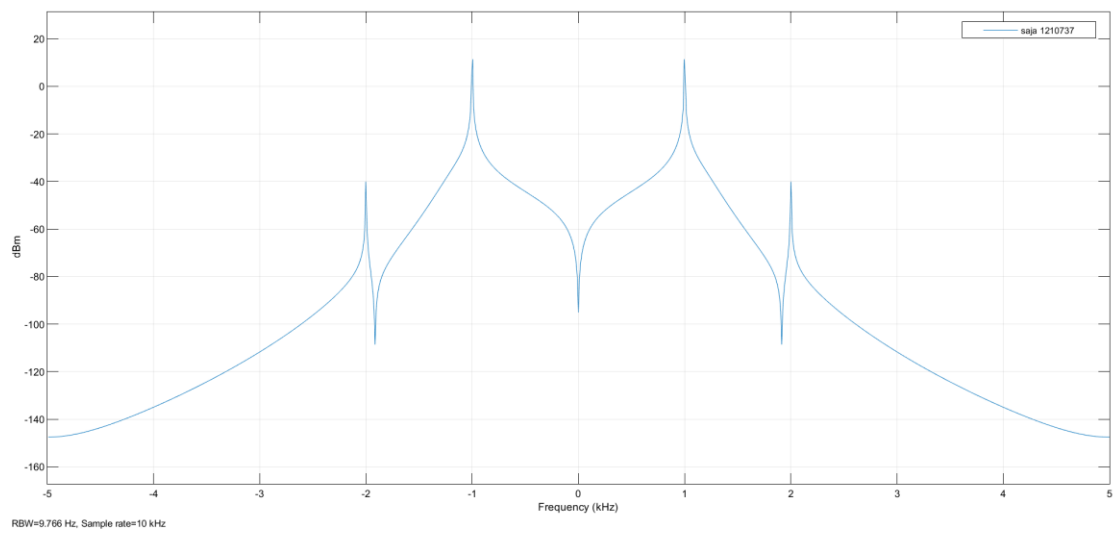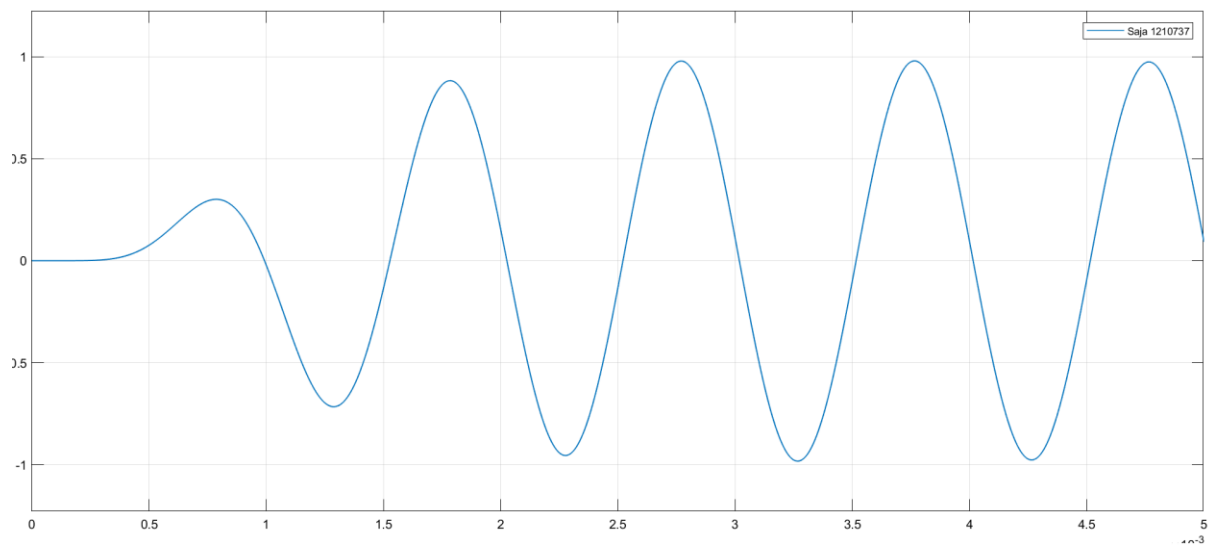**Figure 25: Demodulated Signal using Envelop detector if (u<1)**

RBW=9.766 Hz, Sample rate=10 kHz

Figure 26: spectram of Demodulated Signal using Envelop detector if (u<1)

Figure 27: Demodulated Signal using Envelop detector if (u>1)
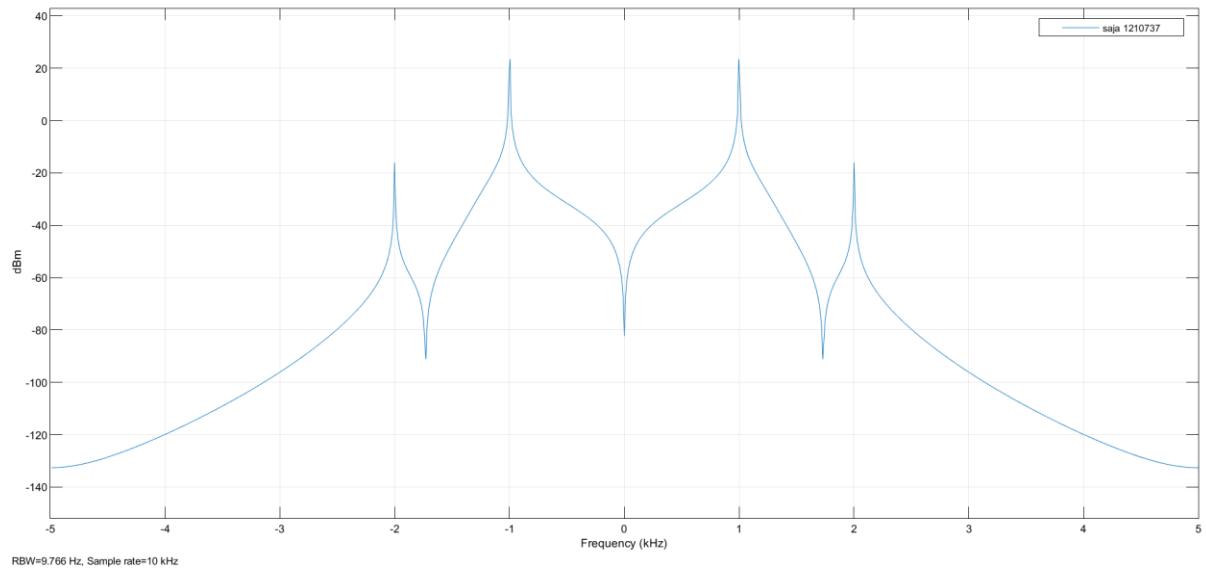
RBW=9.766 Hz, Sample rate=10 kHz

Figure 28: spectram of Demodulated Signal using Envelop detector if (u>1)