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| **العربية** | Communication and Electronics Department Analog Communication - EEC 381  Fall 2023 - 2024 |

REPORT

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|  |  |
| **Section:** | 8 |
|  |  |
| **Department:** | **Communication and Electronics** |

**Experiment One: Double Sided Band Modulation: -**

**Signal in frequency domain:**

A screen shot of a computer screen

Description automatically generated

**Filtered Signal:**

A screen shot of a graph

Description automatically generated

**Filtered Signal in Time Domain:**

A screenshot of a computer

Description automatically generated

**Double Sideband Suppressed Carrier:**

A screenshot of a computer

Description automatically generated

**Double Sideband Transmitted Carrier:**

A screenshot of a computer

Description automatically generated

* **Envelop Detection: -**

1. **Envelop Detection of Double Sideband Suppressed Carrier:**

A screen shot of a computer screen

Description automatically generated

1. **Envelop Detection of Double Sideband Transmitted Carrier:**

A screen shot of a graph

Description automatically generated

-In this point our observations are while playing the sound in case of DSB-SC the sound wasn’t clear and good enough to hear the whole message as there is a lot of attenuation, distortion and phase reversal, in contrast to DSB-TC case the sound was excellent and we can hear the message clearly without distortion or attenuation or phase reversal because of the modulation index which is less than 1, so in summary the envelop detector receiver is much better with DSB-TC but in cases where modulation index is less than (Under modulation) or equal (Critical modulation) 1 other than these cases the envelop detector will be bad choice to receive a DSB signal and coherent detector will be better.

* **Coherent Detection:**

1. **SNR = 0:**

**Signal in Time Domain:**

A screen shot of a graph

Description automatically generated

**Signal in Frequency Domain:**

A screen shot of a graph

Description automatically generated

1. **SNR = 10:**

**Signal in Time Domain:**

A screen shot of a graph

Description automatically generated

**Signal in Frequency Domain:**

A screen shot of a graph

Description automatically generated

1. **SNR=30:**

**Signal in Time Domain:**

A screen shot of a computer screen

Description automatically generated

**Signal in Frequency Domain:**

A screen shot of a graph

Description automatically generated

1. **Frequency Shift and SNR=0:**

**Signal in Time Domain:**

A screen shot of a computer screen

Description automatically generated

**Signal in Frequency Domain:**

A screen shot of a graph

Description automatically generated

1. **Frequency Shift and SNR=10:**

**Signal in Time Domain:**

A screen shot of a computer

Description automatically generated

**Signal in Frequency Domain:**

A screen shot of a graph

Description automatically generated

1. **Frequency Shift and SNR=30:**

**Signal in Time Domain:**

A screen shot of a computer screen

Description automatically generated

**Signal in Frequency Domain:**

A screen shot of a graph

Description automatically generated

-For proper detection with coherent detector it shouldn’t be any phase or frequency errors between the transmitter and the receiver so in our case we have here shift in frequency which leads to distortion in the received message and this phenomenon is called Beat effect.

1. **Phase Error and SNR=0:**

**Signal in Time Domain:**

A screen shot of a computer screen

Description automatically generated

**Signal in Frequency Domain:**

A screen shot of a graph

Description automatically generated

1. **Phase Error and SNR=10:**

**Signal in Time Domain:**

A screen shot of a computer

Description automatically generated

**Signal in Frequency Domain:**

A screen shot of a graph

Description automatically generated

1. **Phase Error and SNR=30:**

**Signal in Time Domain:**

A screen shot of a computer screen

Description automatically generated

**Signal in Frequency Domain:**

A screen shot of a graph

Description automatically generated

**Experiment Two: Single Side Band Modulation: -**

**Signal in frequency domain:**

A screen shot of a computer screen

Description automatically generated

**Filtered Signal:**

A screen shot of a computer screen

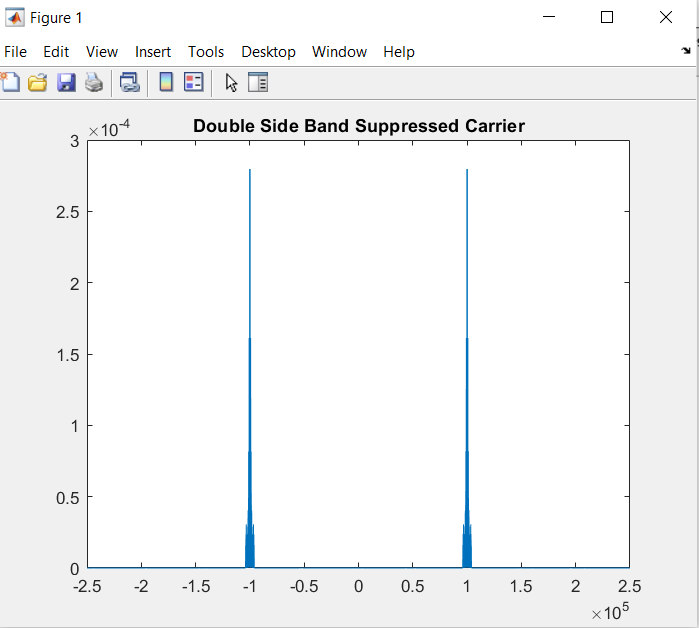
Description automatically generated

**Filtered Signal in Time Domain:**

A screen shot of a computer

Description automatically generated

**Double Sideband Suppressed Carrier:**

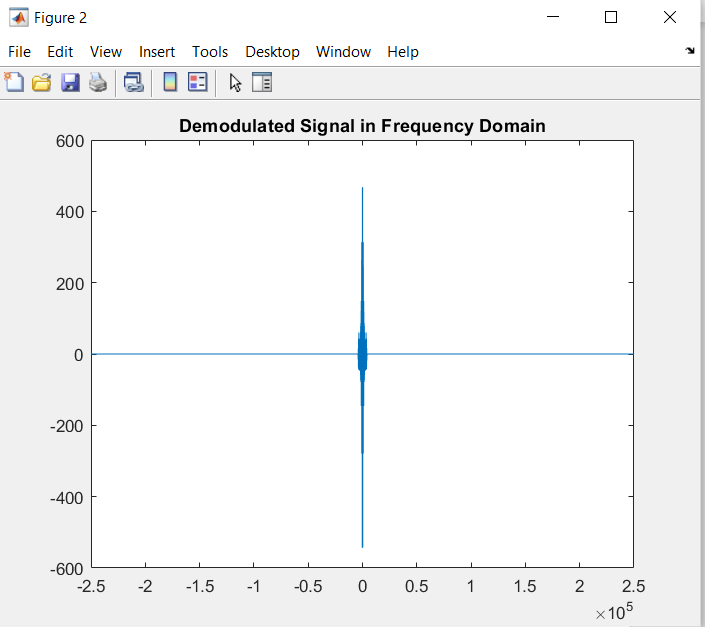


**Single Sided Band (LSB only):**

A screenshot of a computer

Description automatically generated

**Demodulated signal spectrum:**



**Demodulated signal in time domain:**

A screen shot of a computer screen

Description automatically generated

**Demodulated signal spectrum Using a practical 4th order Butterworth filter:**

A screen shot of a graph

Description automatically generated

**Demodulated signal spectrum Using a practical 4th order Butterworth filter in time domain:**

A screen shot of a computer screen

Description automatically generated

* **Coherent Detection:**

1. **SNR = 0:**

**Signal in Time Domain:**

A screen shot of a computer screen

Description automatically generated

**Signal in Frequency Domain:**

A screen shot of a graph

Description automatically generated

1. **SNR = 10:**

**Signal in Time Domain:**

A screen shot of a graph

Description automatically generated

**Signal in Frequency Domain:**

A screen shot of a graph

Description automatically generated

1. **SNR=30:**

**Signal in Time Domain:**

A screen shot of a graph

Description automatically generated

**Signal in Frequency Domain:**

A screenshot of a graph

Description automatically generated

**Single Sided Band Transmitted Carrier:**

A screenshot of a computer

Description automatically generated

**Demodulated signal using Envelop detection:**

A screen shot of a computer

Description automatically generated

**Experiment Three: Frequency Modulation: -**

**Signal in frequency domain:**

A screen shot of a graph

Description automatically generated

**Filtered Signal:**

A screen shot of a graph

Description automatically generated

**Filtered Signal in Time Domain:**

A screen shot of a computer

Description automatically generated

**Modulated NBFM signal in Frequency Domain:**

A screenshot of a computer

Description automatically generated

**Demodulated NBFM signal in Frequency Domain:**

A screen shot of a computer

Description automatically generated