**DR BR AMBEDKAR NATIONAL INSTITUTE OF TECHNOLOGY, JALANDHAR**

**ELECTRONICS AND COMMUNICATION DEPARTMENT**

**MINOR PROJECT**

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DOCUMENTATION

**Amplitude\_Modulation:**

**Parameters:**

**message\_angular\_freq: { “any integer value” } , default=1**

Frequency of the message signal.

**carrier\_angular\_freq: { “any integer value” }, default=10**

Frequency of the carrier signal.

**message\_amplitude: { “any integer value” }, default =30**

Amplitude of the message signal.

**carrier\_amplitude: { “any integer value” }, default=50**

Amplitude of the carrier signal.

**time\_start:{ “any integer value” }, default=0**

Time start tells us at what time our message signal starts

**time\_end: { “any integer value greater than time\_start” }, default=5**

Time end tells when our message signal lends

**message\_phase: {“any float value”}, default=0.0**

Phase of the message signal

**carrier\_phase: {“any float value”}, default=0**

Phase of the carrier signal.

**message\_signal: {“sin”,”cos”}, default=”sin”**

Message signal function

**carrier\_signal: {“sin”, “cos”}, default=”sin”**

Carrier signal function

**samplingFrequency: {“any integer value”}, default=100**

Sampling frequency value

**get\_modulated\_signal:**

Parameters: None

Returns the modulated signal

**get\_carrier\_signal:**

Parameters: None

Returns the carrier Signal

**Get\_message\_signal:**

Parameters: None

Returns the message signal

**Get\_time:**

Parameters:None

Returns the time interval

**Analog\_multiplier:**

Parameters: None

Returns the detailed analysis of how the carrier signal is modulated with the message signal and gives the detailed visual explanation of each step involved in the modulation using Analog Multiplier

**Square\_law\_modulator:**

Parameters: a,b,c,d

a: Default = 1

b: Default=0.5

c: Default=0.1

d: Default=0.01

\*\*Remember that the values of the a,b,c,d are selected in such a way that their tuning will result in correct output.. \*\*

Returns the details analysis o the how the carrier signal is modulated with the message signal and gives the detailed visual explanation of each step involve in the modulation using Square law modulator.

**Phase\_shift\_method:**

Parameters: angle\_oscillator: {“any angle value in radians”}

Tells what phase the carrier frequency should be changed

Angle\_message: {“any angle value in radians”}

Tells what phase the message frequency should be changed

Upper: {“True”,”False”}

True if we want upper side band,False otherwise.

Returns the details analysis o the how the carrier signal is modulated with the message signal and gives the detailed visual explanation of each step involve in the modulation using Phase shift method.

**Fourier\_transfrom:**

Parameters:

Signal : {“input signal”}, default:None

Prints the visual representation of the fourier transform of the given signal.

**Plot:**

Parameters:

X\_value:{“array of x axis values”}, default:None

Y\_value:{“array of y axis values”}, default:None

Title:{“string”}, default:”TITLE”

x\_label:{“String”}, default:”\_”

y\_label:{“String”},default:”\_”

**dsbsc:**

Parameters:None

Returns the Double Sideband Suppressed Carrier signal with the parameters given to the Amplitude\_Modulation method

**Ssbsc\_lower:**

Parameters:None

Returns the Single Sideband Suppressed Carrier lower band signal with the parameters given to the Amplitude\_Modulation method

**Ssbsc\_upper:**

Parameters:None

Returns the Single Sideband Suppressed Carrier upper band signal with the parameters given to the Amplitude\_Modulation method

**Frequency\_Modulation:**

Parameters:

**message\_angular\_freq:{ “any integer value” } , default=1**

Frequency of the message signal.

**carrier\_angular\_freq: { “any integer value” }, default=10**

Frequency of the carrier signal.

**message\_amplitude: { “any integer value” }, default =30**

Amplitude of the message signal.

**carrier\_amplitude: { “any integer value” }, default=50**

Amplitude of the carrier signal.

**time\_start:{ “any integer value” }, default=0**

Time start tells us at what time our message signal starts

**time\_end: { “any integer value greater than time\_start” }, default=5**

Time end tells when our message signal lends

**message\_phase: {“any float value”}, default=0.0**

Phase of the message signal

**carrier\_phase: {“any float value”}, default=0**

Phase of the carrier signal.

**message\_signal: {“sin”,”cos”}, default=”sin”**

Message signal function

**carrier\_signal: {“sin”, “cos”}, default=”sin”**

Carrier signal function

**samplingFrequency: {“any integer value”}, default=100**

Sampling frequency value

**get\_modulated\_signal:**

Parameters: None

Returns the modulated signal

**get\_carrier\_signal:**

Parameters: None

Returns the carrier Signal

**Get\_message\_signal:**

Parameters: None

Returns the message signal

**Get\_time:**

Parameters:None

Returns the time interval

**Fourier\_transfrom:**

Parameters:

Signal : {“input signal”}, default:None

Prints the visual representation of the fourier transform of the given signal.

**Plot:**

Parameters:

X\_value:{“array of x axis values”}, default:None

Y\_value:{“array of y axis values”}, default:None

Title:{“string”}, default:”TITLE”

x\_label:{“String”}, default:”\_”

y\_label:{“String”},default:”\_”

**direct\_method:**

Parameters:

L: {“any floating point value”} , default : 0.1

C: {“any floating point value”}, default : 0.1

K: {“any floating point value”}, default: 0.0055

Returns the detailed analysis of how the carrier signal is modulated with the message signal and gives the detailed visual explanation of each step involved in the modulation using Direct method

PhaseModulation:

Parameters:

**message\_angular\_freq: { “any integer value” } , default=1**

Frequency of the message signal.

**carrier\_angular\_freq: { “any integer value” }, default=10**

Frequency of the carrier signal.

**message\_amplitude: { “any integer value” }, default =30**

Amplitude of the message signal.

**carrier\_amplitude: { “any integer value” }, default=50**

Amplitude of the carrier signal.

**time\_start:{ “any integer value” }, default=0**

Time start tells us at what time our message signal starts

**time\_end: { “any integer value greater than time\_start” }, default=5**

Time end tells when our message signal lends

**message\_phase: {“any float value”}, default=0.0**

Phase of the message signal

**carrier\_phase: {“any float value”}, default=0**

Phase of the carrier signal.

**message\_signal: {“sin”,”cos”}, default=”sin”**

Message signal function

**carrier\_signal: {“sin”, “cos”}, default=”sin”**

Carrier signal function

**samplingFrequency: {“any integer value”}, default=100**

Sampling frequency value

**get\_modulated\_signal:**

Parameters: None

Returns the modulated signal

**get\_carrier\_signal:**

Parameters: None

Returns the carrier Signal

**Get\_message\_signal:**

Parameters: None

Returns the message signal

**Get\_time:**

Parameters:None

Returns the time interval

**Fourier\_transfrom:**

Parameters:

Signal : {“input signal”}, default:None

Prints the visual representation of the fourier transform of the given signal.

Plot:

Parameters:

X\_value:{“array of x axis values”}, default:None

Y\_value:{“array of y axis values”}, default:None

Title:{“string”}, default:”TITLE”

x\_label:{“String”}, default:”\_”

y\_label:{“String”},default:”\_”

**direct\_method:**

Parameters:

L: {“any floating point value”} , default : 0.1

C: {“any floating point value”}, default : 0.1

K: {“any floating point value”}, default: 0.0055

Returns the detailed analysis of how the carrier signal is modulated with the message signal and gives the detailed visual explanation of each step involved in the modulation using Direct method

**AM\_Demodulation:**

**Fourier\_transfrom:**

Parameters:

Signal : {“input signal”}, default:None

Prints the visual representation of the fourier transform of the given signal.

Plot:

Parameters:

X\_value:{“array of x axis values”}, default:None

Y\_value:{“array of y axis values”}, default:None

Title:{“string”}, default:”TITLE”

x\_label:{“String”}, default:”\_”

y\_label:{“String”},default:”\_”

**demod**:

Parameters:

Signal: {“Amplitude modulated signal in the form of an array”},default: None

**FM\_demod:**

**Fourier\_transfrom:**

Parameters:

Signal : {“input signal”}, default:None

Prints the visual representation of the fourier transform of the given signal.

**Plot:**

Parameters:

X\_value:{“array of x axis values”},default:None

Y\_value:{“array of y axis values”}, default:None

Title:{“string”}, default:”TITLE”

x\_label:{“String”}, default:”\_”

y\_label:{“String”},default:”\_”

**envelope\_detector:**

Parameters:

Signal: { “input signal” } , default: None

**demod:**

Parameters:

**Signal: {“Amplitude modulated signal in the form of an array”},default: None**

**PM\_demod:**

**Fourier\_transfrom:**

Parameters:

Signal : {“input signal”}, default:None

Prints the visual representation of the fourier transform of the given signal.

**Plot**:

Parameters:

X\_value:{“array of x axis values”}, default:None

Y\_value:{“array of y axis values”}, default:None

Title:{“string”}, default:”TITLE”

x\_label:{“String”}, default:”\_”

y\_label:{“String”},default:”\_”

**envelope\_detector:**

Parameters:

Signal: { “input signal” } , default: None

**demod:**

Parameters:

Signal: {“Amplitude modulated signal in the form of an array”},default: None