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EXPERIMENT-1

Aim:

* To observe the amplitude modulated wave and corresponding spectrum for different modulation index.
* Observe the spectrum for carrier and amplitude modulated wave being switched off one by one.
* Observe the amplitude modulated wave when carrier wave being square, triangle and sawtooth.

Theory:

AM was the earliest modulation method used for transmitting the audio in broadcasting. To transmit signal wirelessly, it must be modulated by a frequency carrier so that antenna of practical size is used.
The amplitude modulator generates a signal

$$s(t) = [\hat{s} + m(t) K_m] \cos(\omega t)$$

$\hat{s}$ ← carrier wave; K_m ← sensitivity of amplitude modulator; $m(t)$ ← modulating signal

Procedure:

1) Switch on the source and carrier wave.
Adjust the modulation index and observe the spectrum analyser and oscilloscope.

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b) Switch off the carrier and modulating wave one by one and observe the waveforms.
Repeat this for different kind of waveforms for carrier and modulating waveform.

c) Change the waveform types of carrier signal to triangular, square and sawtooth.
Observe the varying waveforms in the oscilloscope.

Observations :

2. Different waveform with different amplitude observed for different modulation indices, and for different kinds of carrier waves ; square, triangle, sawtooth.

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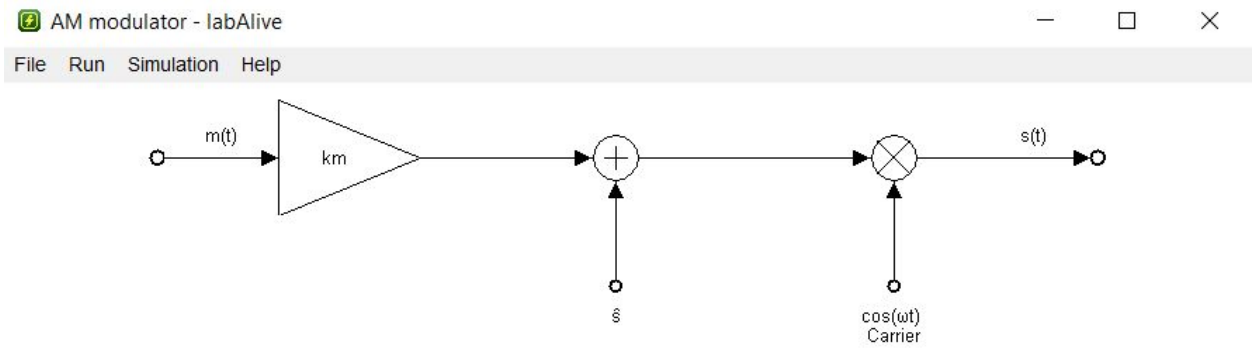
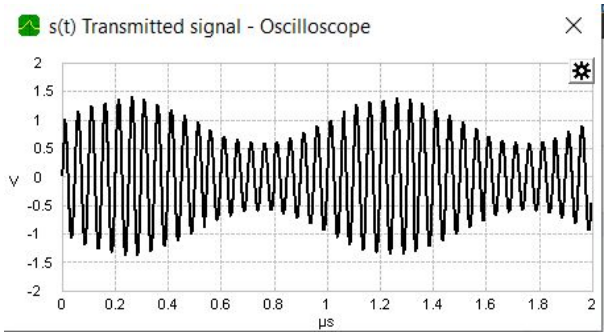
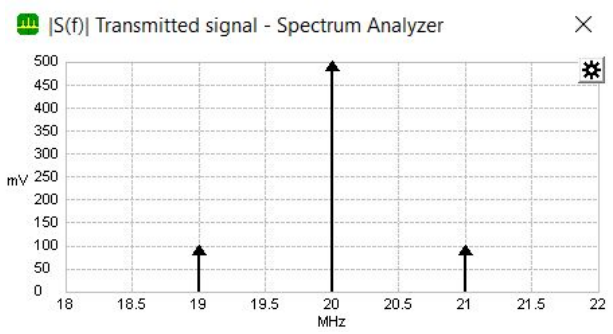
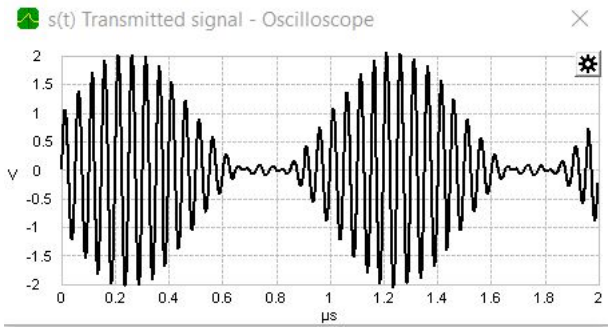


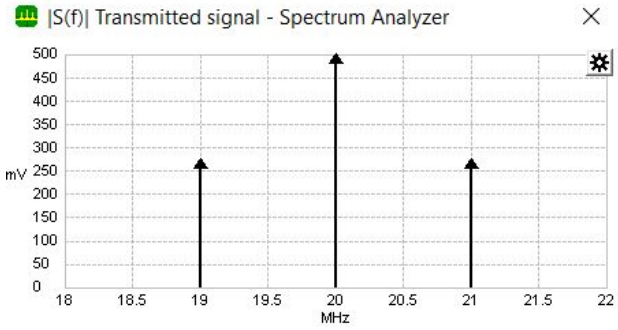
Modulation Index = 0.4



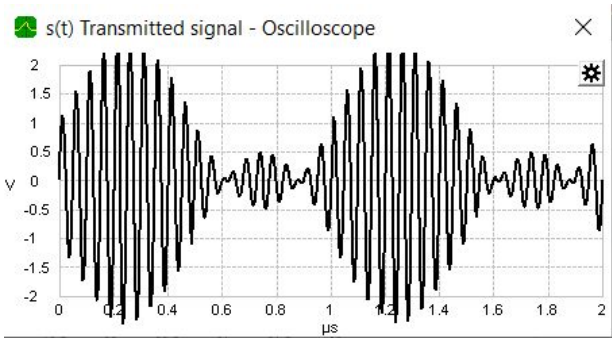


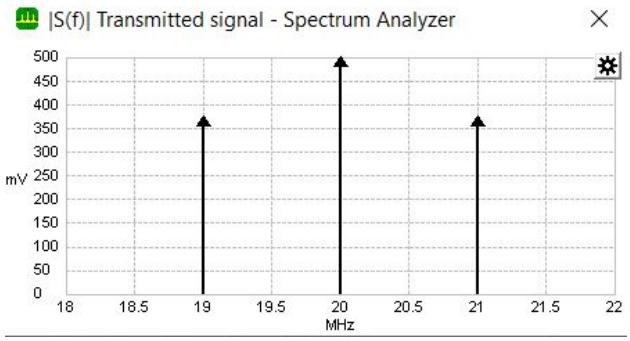
Modulation Index = 1.1



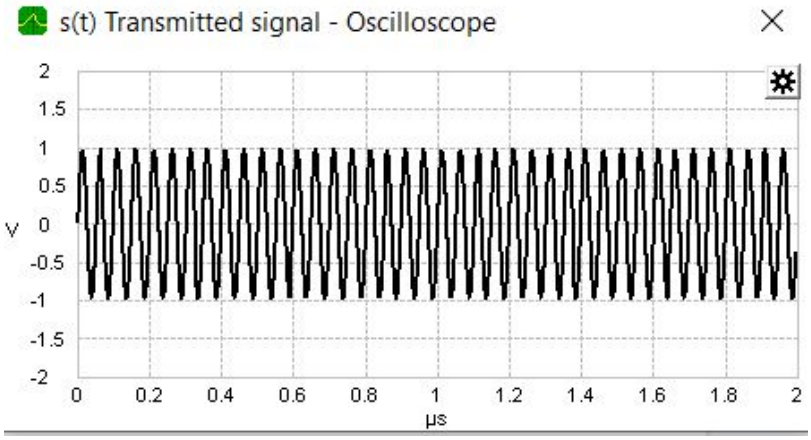


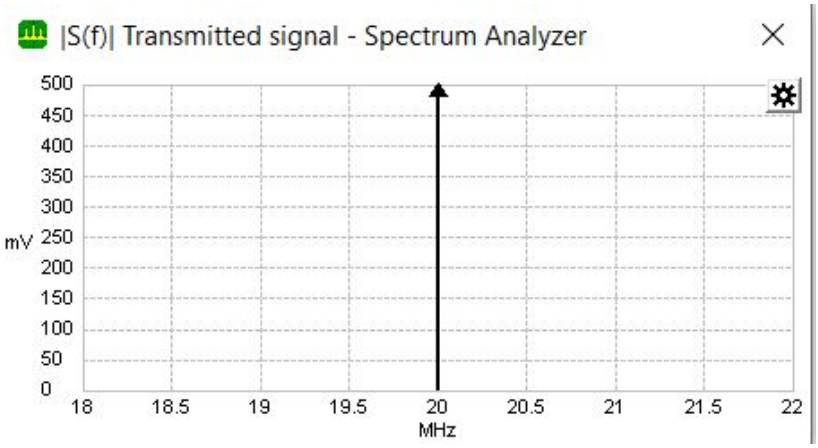
Modulation Index = 1.5



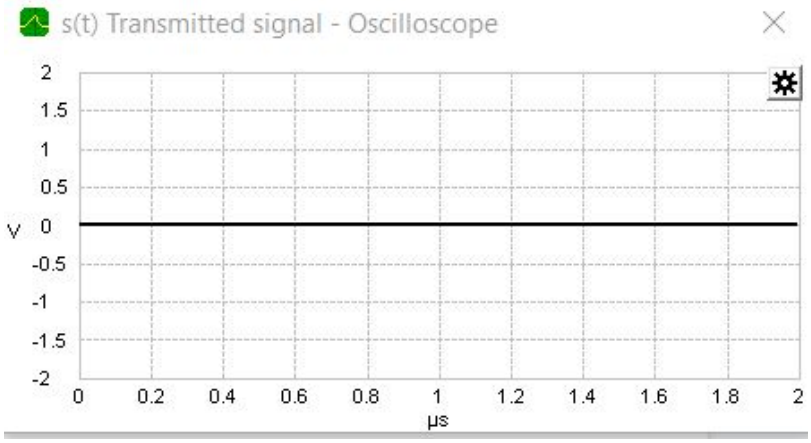


Message Signal Turned OFF



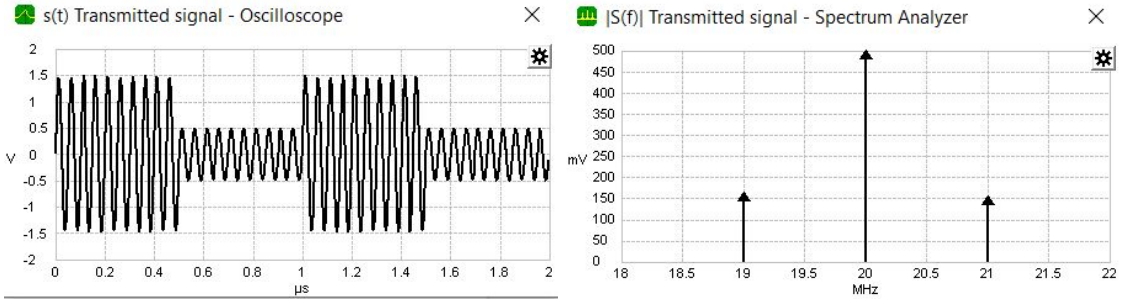


Carrier Wave Switched OFF

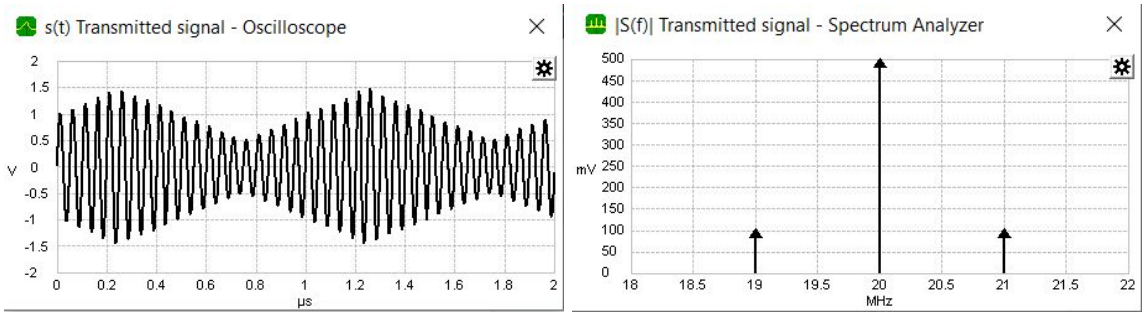


Amplitude Modulated Wave as -

1. Square



2. Triangle



3. Sawtooth