



Name: Allen Ben Philipose

Registration No: 18BIS0043

Subject Code: ECE3029

Slot: L15 + L16 + L29 + L30

Faculty: Dr. Sivakumar R

Lab Assesment – 2

Frequency Modulation

Aim

To input a message signal in sine wave form and use a carrier wave to make it frequency modulated signal, ready to transmit. Also, demodulate the same, on the receiver end and retain the original message signal – which will be updated later.

Abstract

Frequency modulation is an advantageous method used to transmit message signals. The message is modulated using a carrier wave of a higher frequency and then transmitted. There are few advantages that come along with this method, such as having lesser noise effects.

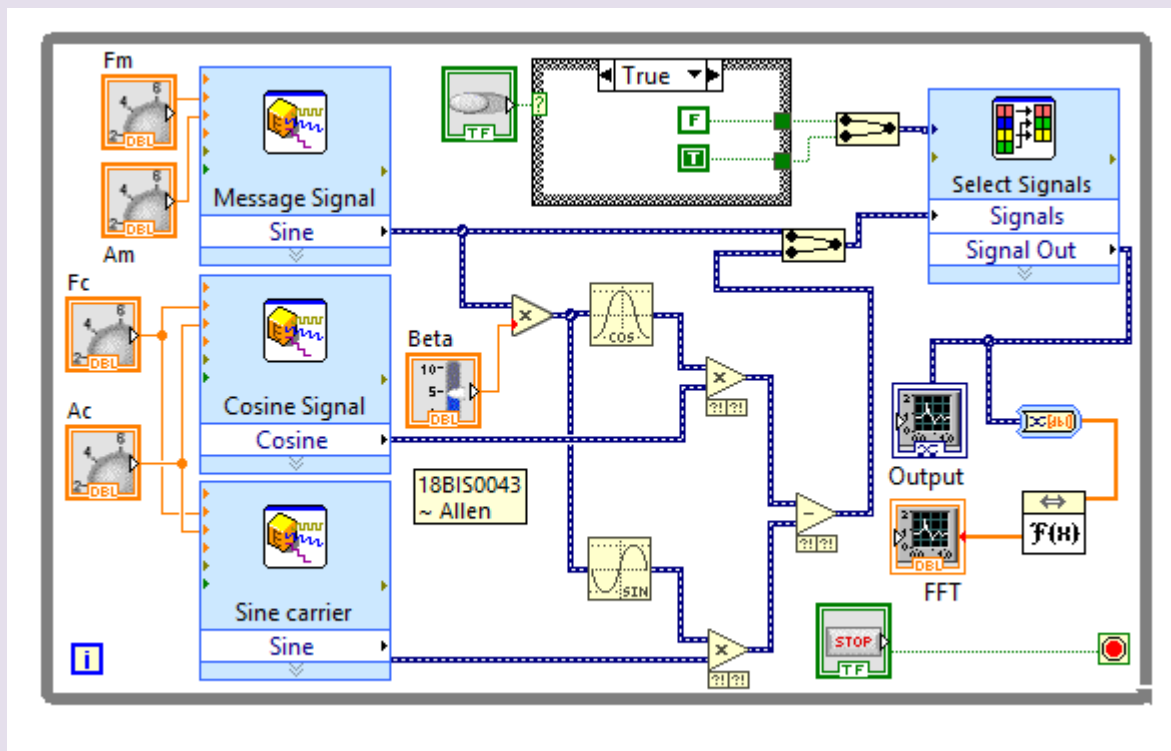
Therefore, this LabVIEW program accepts the amplitude and the frequency of the message wave, the amplitude and frequency of the carrier wave and the modulation index, from the user, for displaying the output and the FFT. This prototype gives the user plenty of control over the input and the desired output and is well elegantly displayed with minimal number of output screens and simple instructions easily understandable.

Formula

$$FM = \cos(w_c t) \cos(b \times \sin(w_m t)) - \sin(w_c t) \sin(b \times \sin(w_m t))$$

Where A_c and A_m is considered as 1

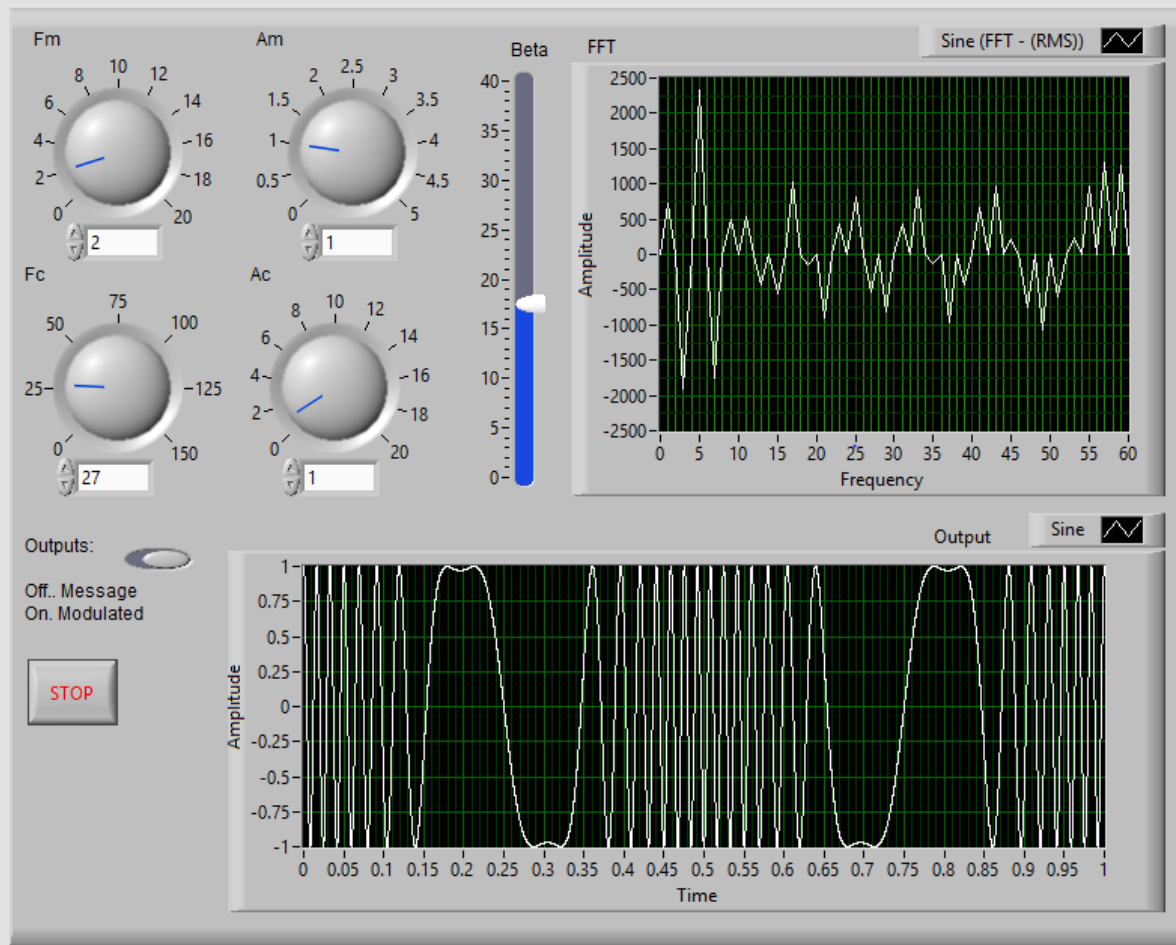
Circuit Diagram



Components

- ✓ *Input Knobs with digital display for Carrier amplitude, Carrier Frequency, Message amplitude, Message frequency and Modulation Index.*
- ✓ *Output screens for showing input and output using multiplexing, and the corresponding spectral graph*
- ✓ *Similar to amplitude modulation, but is considered better due to the reliability and the ability to retain the closest to the input at the destination.*
- ✓ *Switch toggle between the input and the modulated wave*

Board Diagram



The stop button can be considered as a switch off to the running loop and will return the program to the initial menu freezing the current output.

Result

The message signal is modulated using FM on the transmitting end and can be demodulated on the receiver end using LabVIEW software.