**CIE 337: Communication Theory**

**Project 1**

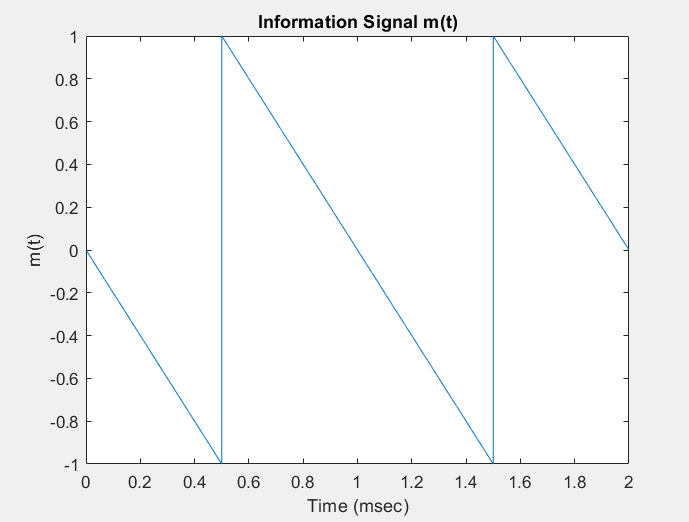
**Part A**

In this part of the project, we perform frequency modulation of a sawtooth signal using MATLAB and examine the modulated signal.

1. **Information Signal Generation**

Our information signal is a horizontally inverted sawtooth signal of amplitude 1 and phase shift of :

Plotting this signal, we get:



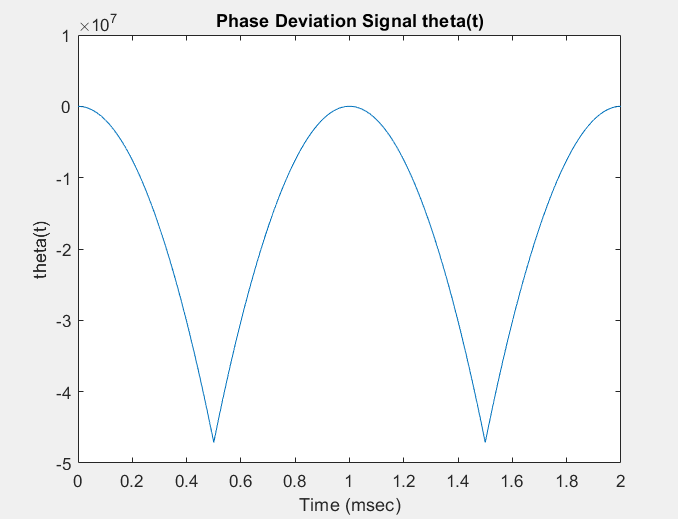
In generating this signal, we used a sampling rate of 30 KHz. This is to accommodate the carrier frequency of 10 KHz which we are going to using in the modulation step later on.

1. **Phase Deviation Signal Generation**

The phase deviation signal in FM is given by:

To integrate our information signal using MATLAB, we used the function which performs integration using the trapezoidal method.

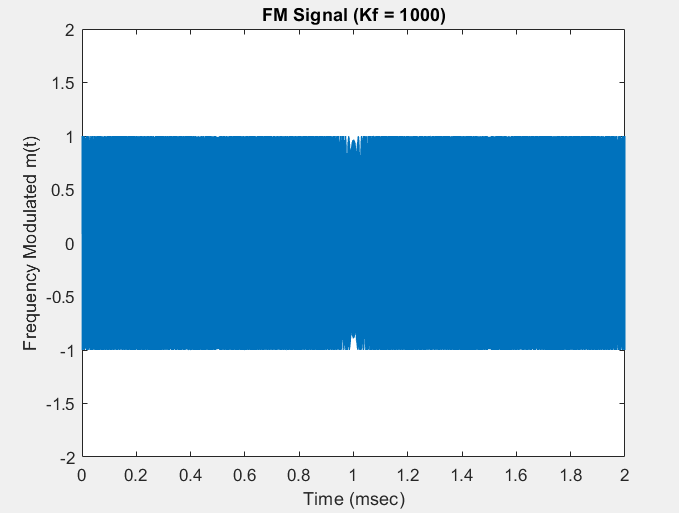
Plotting this signal, we get:



1. **FM Signal Generation**

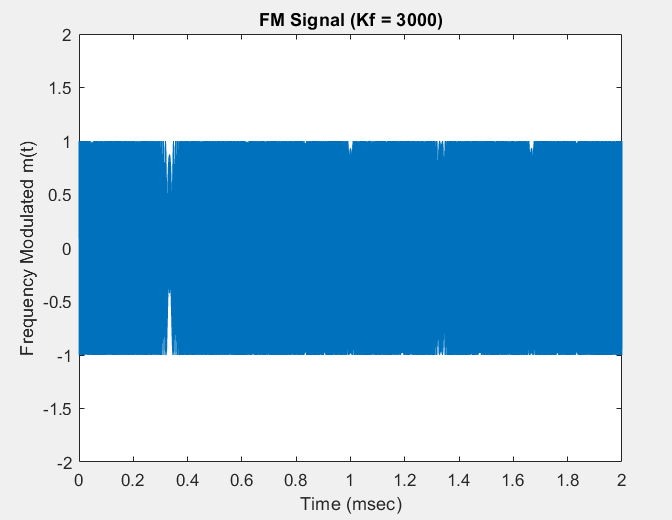
We generate a carrier signal with a 1 volt amplitude and 10 KHz frequency and modulate its phase by the phase deviation signal we generated. We initially set .

Plotting this signal, we get:



1. **Varying**

Setting , the modulated signal becomes:



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