

# Experiment–1

|                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                              |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|
| <b>Aim:</b>                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                              |
| To study the amplitude modulation using MATLAB                                                                                                                                                                                                                                                                                                                                                                         |                                                                              |
| <b>Description:</b>                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                              |
| MATLAB software with essential configurations.                                                                                                                                                                                                                                                                                                                                                                         |                                                                              |
| <b>Theory:</b>                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                              |
| <p>Amplitude modulation involves altering the amplitude of a carrier wave while maintaining a constant carrier frequency, thereby encoding original information signals. This process entails transmitting wave signals by modulating their amplitudes. Widely known as AM, it serves as a prevalent method for transmitting data via radio carrier waves, primarily utilized in electronic communication systems.</p> |                                                                              |
| <b>Code:</b>                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                              |
| 1                                                                                                                                                                                                                                                                                                                                                                                                                      | <code>clc;</code>                                                            |
| 2                                                                                                                                                                                                                                                                                                                                                                                                                      | <code>clear all;</code>                                                      |
| 3                                                                                                                                                                                                                                                                                                                                                                                                                      | <code>close all;</code>                                                      |
| 4                                                                                                                                                                                                                                                                                                                                                                                                                      | <code>Ac = 2;                % carrier amplitude</code>                      |
| 5                                                                                                                                                                                                                                                                                                                                                                                                                      | <code>fc = 0.5;            % carrier frequency</code>                        |
| 6                                                                                                                                                                                                                                                                                                                                                                                                                      | <code>Am = 0.5;            % message signal amplitude</code>                 |
| 7                                                                                                                                                                                                                                                                                                                                                                                                                      | <code>fm = 0.05;          % message signal frequency</code>                  |
| 8                                                                                                                                                                                                                                                                                                                                                                                                                      | <code>Fs = 100;           % sampling rate/frequency</code>                   |
| 9                                                                                                                                                                                                                                                                                                                                                                                                                      | <code>ka = 1;              % Amplitude Sensitivity</code>                    |
| 10                                                                                                                                                                                                                                                                                                                                                                                                                     | <code>t = [0:0.1:50];                % time range in steps of 0.1</code>     |
| 11                                                                                                                                                                                                                                                                                                                                                                                                                     | <code>ct = Ac * cos(2 * pi * fc * t);    % carrier signal</code>             |
| 12                                                                                                                                                                                                                                                                                                                                                                                                                     | <code>mt = Am * cos(2 * pi * fm * t);    % message signal</code>             |
| 13                                                                                                                                                                                                                                                                                                                                                                                                                     | <code>AM = ct .* (1 + ka * mt);          % amplitude modulated signal</code> |
| 14                                                                                                                                                                                                                                                                                                                                                                                                                     | <code>subplot(3,1,1);                % Message signal</code>                 |
| 15                                                                                                                                                                                                                                                                                                                                                                                                                     | <code>plot(mt);</code>                                                       |
| 16                                                                                                                                                                                                                                                                                                                                                                                                                     | <code>ylabel('Message signal');</code>                                       |
| 17                                                                                                                                                                                                                                                                                                                                                                                                                     | <code>subplot(3,1,2);                % Carrier signal</code>                 |
| 18                                                                                                                                                                                                                                                                                                                                                                                                                     | <code>plot(ct);</code>                                                       |
| 19                                                                                                                                                                                                                                                                                                                                                                                                                     | <code>ylabel('Carrier');</code>                                              |
| 20                                                                                                                                                                                                                                                                                                                                                                                                                     | <code>subplot(3,1,3);                % AM signal</code>                      |
| 21                                                                                                                                                                                                                                                                                                                                                                                                                     | <code>plot(AM);</code>                                                       |
| 22                                                                                                                                                                                                                                                                                                                                                                                                                     | <code>ylabel('AM signal')</code>                                             |
| 23                                                                                                                                                                                                                                                                                                                                                                                                                     | <code>sgtitle('Sujal Singh (04119051723)')</code>                            |

## Output:

Sujal Singh (04119051723)

