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% Parameters
fs = 10000;           % Sampling frequency (Hz)
t = 0:1/fs:1;         % Time vector (1 second duration)
fc = 200;             % Carrier frequency (Hz)
fm = 20;              % Message frequency (Hz)
Am = 1;               % Amplitude of message signal
Ac = 2;               % Amplitude of carrier signal
kf = 100;             % Frequency deviation constant (Hz per unit amplitude)1

% Message signal (sinusoidal)
message = Am * sin(2 * pi * fm * t);

% FM signal
fm_signal = Ac * cos(2 * pi * fc * t + (2 * pi * kf) * cumsum(message) / fs);

% Plot results
figure;

% Message signal
subplot(2, 1, 1);
plot(t, message);
title('Message Signal');
xlabel('Time (s)');
ylabel('Amplitude');

% FM signal
subplot(2, 1, 2);
plot(t, fm_signal);
title('Frequency Modulated (FM) Signal');
xlabel('Time (s)');
ylabel('Amplitude');
;

% FM signal
subplot(2, 1, 2);
plot(t, fm_signal);
title('FM Signal');
xlabel('Time (s)');
ylabel('Amplitude');
```