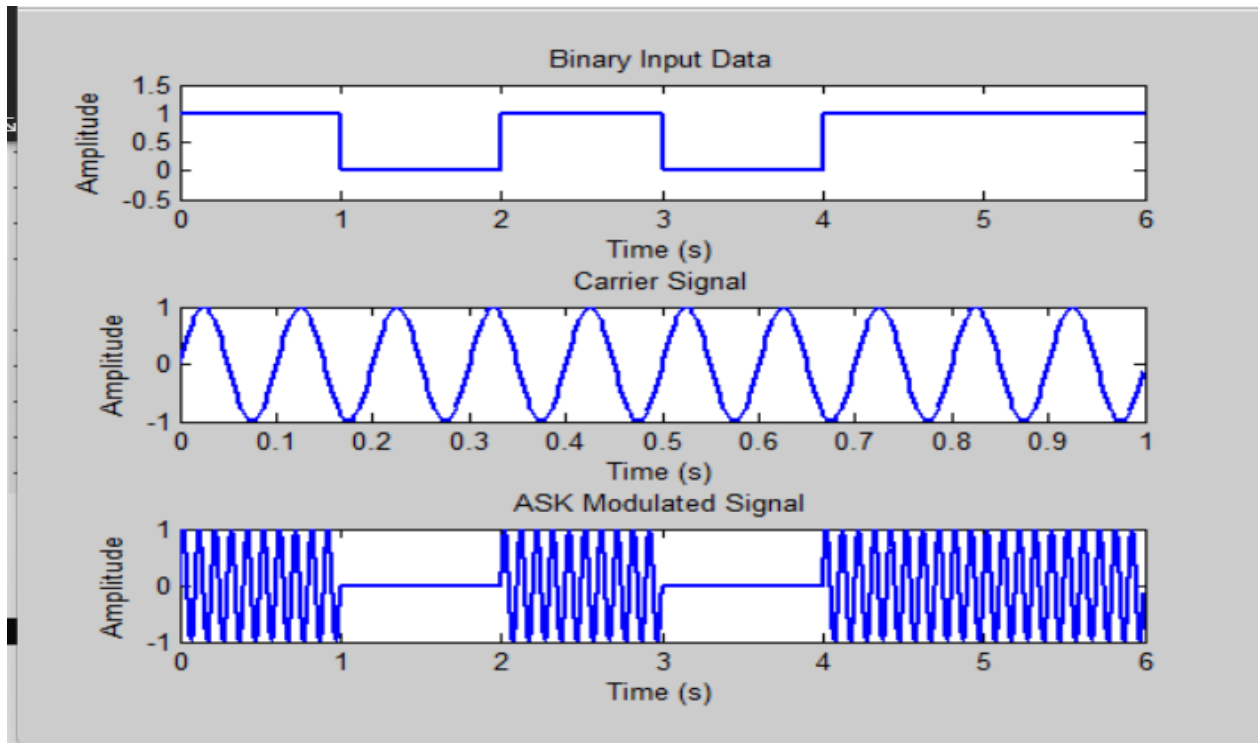


## Problem 1: Implementation of ASK

Source Code:

```
Editor - D:\Academic\2nd year\2nd semester\Data Communication Lab\Lab 4\ask.m*
ask.m*  +
1 -     clc;
2 -     clear all;
3 -     close all;
4 -     data = [1 0 1 0 1 1];
5
6 -     Tb = 1;           % Bit duration in seconds
7 -     fc = 10;          % Carrier frequency in Hz
8 -     fs = 500;         % Sampling frequency
9 -     t = 0:1/fs:Tb-1/fs; % Time vector for one bit
10 -    carrier = sin(2*pi*fc*t);
11
12 -    ASK_signal = [];
13 -    for i = 1:length(data)
14 -        if data(i) == 1
15 -            ASK_bit = carrier;
16 -        else
17 -            ASK_bit = zeros(1, length(t));
18 -        end
19 -        ASK_signal = [ASK_signal ASK_bit];
20 -    end
21
22 -    time = 0:1/fs:Tb*length(data)-1/fs;
23 -    figure;
24 -    % Binary Data
25 -    subplot(3,1,1);
26 -    stairs(0:Tb:Tb*length(data), [data data(end)], 'LineWidth', 2);
27 -    title('Binary Input Data');
28 -    xlabel('Time (s)');
29 -    ylabel('Amplitude');
30 -    ylim([-0.5 1.5]);
31 -    % Carrier Signal
32 -    subplot(3,1,2);
33 -    plot(t, carrier, 'LineWidth', 2);
34 -    title('Carrier Signal');
35 -    xlabel('Time (s)');
36 -    ylabel('Amplitude');
37 -    % ASK Modulated Signal
38 -    subplot(3,1,3);
39 -    plot(time, ASK_signal, 'LineWidth', 2);
40 -    title('ASK Modulated Signal');
41 -    xlabel('Time (s)');
42 -    ylabel('Amplitude');
```

Output:



## Problem 2: Implementation of FSK

Source Code:

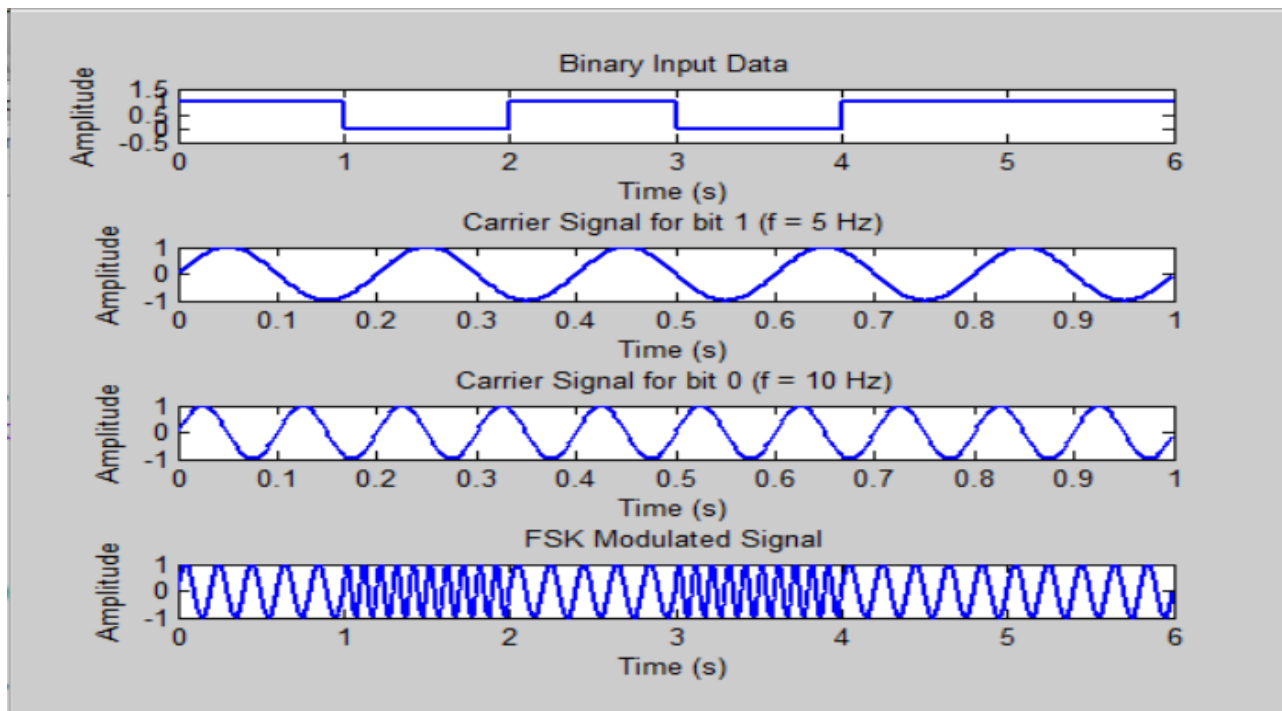
```
Editor - D:\Academic\2nd year\2nd semester\Data Communication Lab\Lab 4\fsk.m
ask.m  fsk.m  +
1 -   clc;
2 -   clear all;
3 -   close all;
4 -   data = [1 0 1 0 1 1];
5
6 -   Tb = 1;           % Bit duration (seconds)
7 -   fc1 = 5;          % Frequency for binary 1
8 -   fc2 = 10;         % Frequency for binary 0
9 -   fs = 500;         % Sampling frequency
10 -  t = 0:1/fs:Tb-1/fs; % Time vector for one bit
11 -  FSK_signal = [];
12
13 -  % FSK Modulation
14 -  for i = 1:length(data)
15 -      if data(i) == 1
16 -          FSK_bit = sin(2*pi*fc1*t);
17 -      else
18 -          FSK_bit = sin(2*pi*fc2*t);
19 -      end
20 -      FSK_signal = [FSK_signal FSK_bit];
21 -  end
```

```

23 - time = 0:1/fs:Tb*length(data)-1/fs;
24 - figure;
25
26 % Binary Data
27 - subplot(4,1,1);
28 - stairs(0:Tb:Tb*length(data), [data data(end)], 'LineWidth', 2);
29 - title('Binary Input Data');
30 - xlabel('Time (s)');
31 - ylabel('Amplitude');
32 - ylim([-0.5 1.5]);
33
34 % Carrier for binary 1
35 - subplot(4,1,2);
36 - plot(t, sin(2*pi*fc1*t), 'LineWidth', 2);
37 - title(['Carrier Signal for bit 1 (f = ' num2str(fc1) ' Hz)']);
38 - xlabel('Time (s)');
39 - ylabel('Amplitude');
40
41 % Carrier for binary 0
42 - subplot(4,1,3);
43 - plot(t, sin(2*pi*fc2*t), 'LineWidth', 2);
44 - title(['Carrier Signal for bit 0 (f = ' num2str(fc2) ' Hz)']);
45 - xlabel('Time (s)');
46 - ylabel('Amplitude');
47
48 % FSK Signal
49 - subplot(4,1,4);
50 - plot(time, FSK_signal, 'LineWidth', 2);
51 - title('FSK Modulated Signal');
52 - xlabel('Time (s)');
53 - ylabel('Amplitude');
54

```

Output:



### Problem 3: Implementation of PSK

Source Code:

```
Editor - D:\Academic\2nd year\2nd semester\Data Communication Lab\Lab 4\psk.m*
ask.m x fsk.m x psk.m* x +
1 - clc;
2 - clear all;
3 - close all;
4 - data = [1 0 1 0 1 1];
5
6 - Tb = 1;          % Bit duration in seconds
7 - fc = 10;         % Carrier frequency in Hz
8 - fs = 500;        % Sampling frequency
9 - t = 0:1/fs:Tb-1/fs; % Time vector for one bit
10 - carrier = sin(2*pi*fc*t);
11 - PSK_signal = [];
12
13 % PSK Modulation
14 - for i = 1:length(data)
15 -     if data(i) == 1
16 -         PSK_bit = carrier;
17 -     else
18 -         PSK_bit = -carrier;
19 -     end
20 -     PSK_signal = [PSK_signal PSK_bit];
21 - end
```

```

23 - time = 0:1/fs:Tb*length(data)-1/fs;
24 - figure;
25 - % Binary Input
26 - subplot(3,1,1);
27 - stairs(0:Tb:Tb*length(data), [data data(end)], 'LineWidth', 2);
28 - title('Binary Input Data');
29 - xlabel('Time (s)');
30 - ylabel('Amplitude');
31 - ylim([-0.5 1.5]);
32 - % Carrier Signal
33 - subplot(3,1,2);
34 - plot(t, carrier, 'LineWidth', 2);
35 - title(['Carrier Signal (f = ' num2str(fc) ' Hz)']);
36 - xlabel('Time (s)');
37 - ylabel('Amplitude');
38 -
39 - % PSK Modulated Signal
40 - subplot(3,1,3);
41 - plot(time, PSK_signal, 'LineWidth', 2);
42 - title('PSK Modulated Signal');
43 - xlabel('Time (s)');
44 - ylabel('Amplitude');

```

Output:

