

HELP

Getting familiar with the interface

Message		Carrier	
$m(t)=V_m*\text{function}(2*\pi*f_m*t)$		$c(t)=A*\text{function}(2*\pi*f_c*t)$	
Function	<input type="text" value="cos"/>	Function	<input type="text" value="cos"/>
V_m	<input type="text" value="1"/>	A	<input type="text" value="1"/>
f_m	<input type="text" value="20"/>	f_c	<input type="text" value="100"/>

Fig. Message & Carrier panels

FM Type	
<input checked="" type="radio"/> Narrowband	<input type="radio"/> Wideband
$\beta=V_m*K/(2*\pi*f_m)$	
<input type="radio"/> K	<input type="text"/>
<input checked="" type="radio"/> β	<input type="text" value="1"/>
Simulation Cycles(n)	
<input type="text" value="10"/>	

Fig. FM type panel, K- β panel & Simulation Cycles edit box

Analysis	
<input checked="" type="radio"/> Time Domain	<input type="radio"/> Frequency domain
<input type="button" value="Generate"/>	
$s(t)=A*\text{function}(2*\pi*f_c*t+K*\text{integral}(m(t)dt))$	

Fig. Analysis panel, Generate button & output signal equation

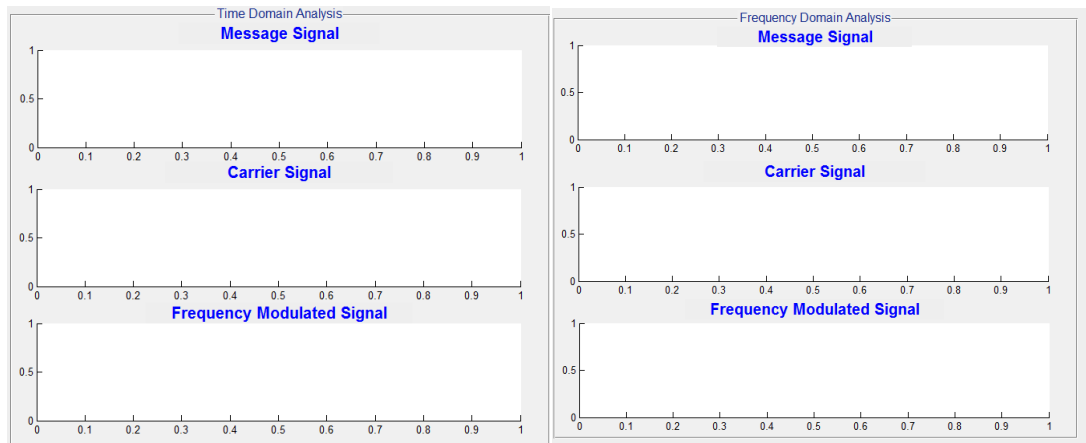


Fig. Time Domain & Frequency Domain analysis panels, changed using Analysis radio buttons



Fig. Data Cursor, Zoom Out & Zoom In buttons

Working with the software

Experiment 1

Observing the Narrowband FM waveform & its frequency spectrum

1. Set the parameters like function, amplitude & frequency for the Message signal using the respective dropdown menu & the text boxes in the **Message** panel.
2. Set the parameters like function, amplitude & frequency for the carrier signal using the respective dropdown menu & the text boxes in the **Carrier** panel.
3. Select **Narrowband** radio button in the **FM Type** panel.
4. If the effect of K_f is to be observed, select **K** radio button in the panel & type the value in the corresponding edit box.

OR

5. If the effect of β is to be observed, select **β** radio button in the panel & type the value in the corresponding edit box.
6. Set the no. of cycles to be observed in the **Simulation Cycles(n)** edit box.
7. Click on **Generate** button. All the plots will be generated in some time.
8. Select **Time Domain** radio button in the **Analysis** panel to observe the time domain waveform.

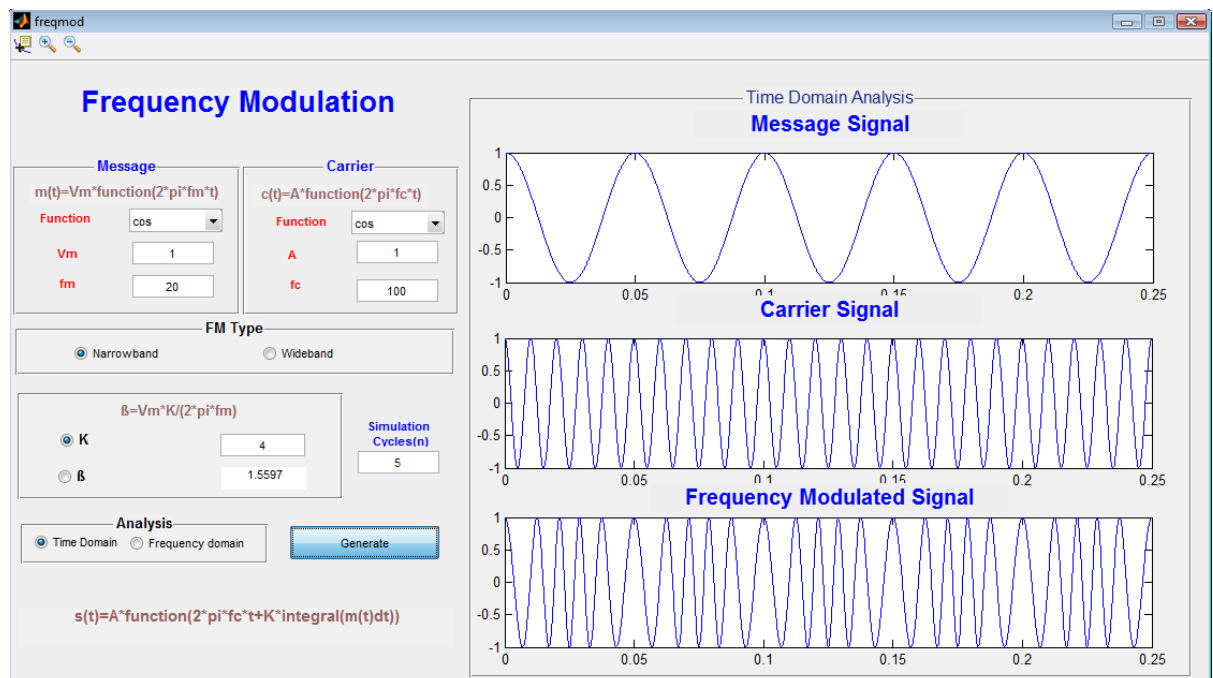


Fig. Time Domain Analysis plot

9. Select **Frequency Domain** radio button in the **Analysis** panel to observe the frequency spectrum.

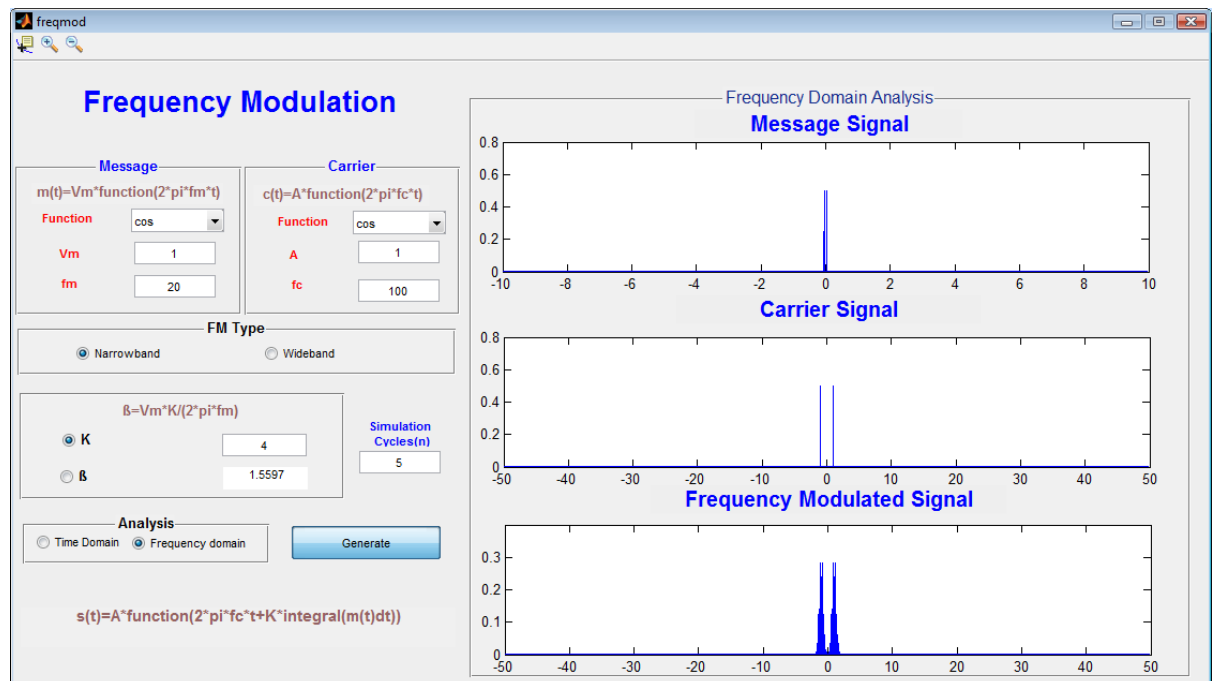


Fig. Frequency Spectrum plot

10. To calculate the bandwidth, use the data cursor. Click on one peak to get coordinates of one peak. To get the coordinates of second peak, **Alt+Click** on the second peak. The difference of X coordinates gives the bandwidth.

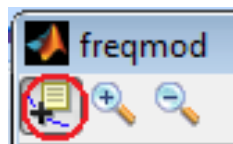


Fig. Data cursor

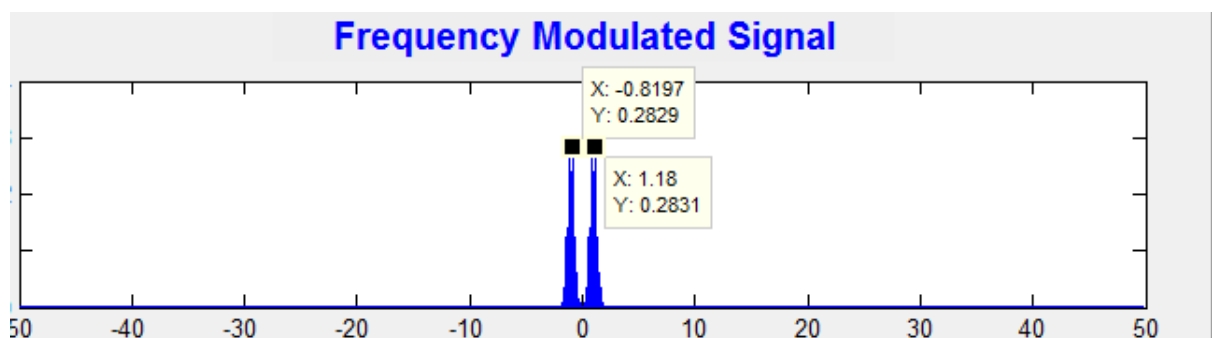


Fig. Markers for bandwidth calculation

Experiment 2

Observing the Wideband FM waveform & its frequency spectrum

1. Set the parameters like function, amplitude & frequency for the Message signal using the respective dropdown menu & the text boxes in the **Message** panel.
2. Set the parameters like function, amplitude & frequency for the carrier signal using the respective dropdown menu & the text boxes in the **Carrier** panel.
3. Select **Wideband** radio button in the **FM Type** panel.
4. If the effect of K_f is to be observed, select **K** radio button in the panel & type the value in the corresponding edit box.
OR
5. If the effect of β is to be observed, select **β** radio button in the panel & type the value in the corresponding edit box.
6. Set the no. of cycles to be observed in the **Simulation Cycles(n)** edit box.
7. Click on **Generate** button. All the plots will be generated in some time.
8. Select **Time Domain** radio button in the **Analysis** panel to observe the time domain waveform.

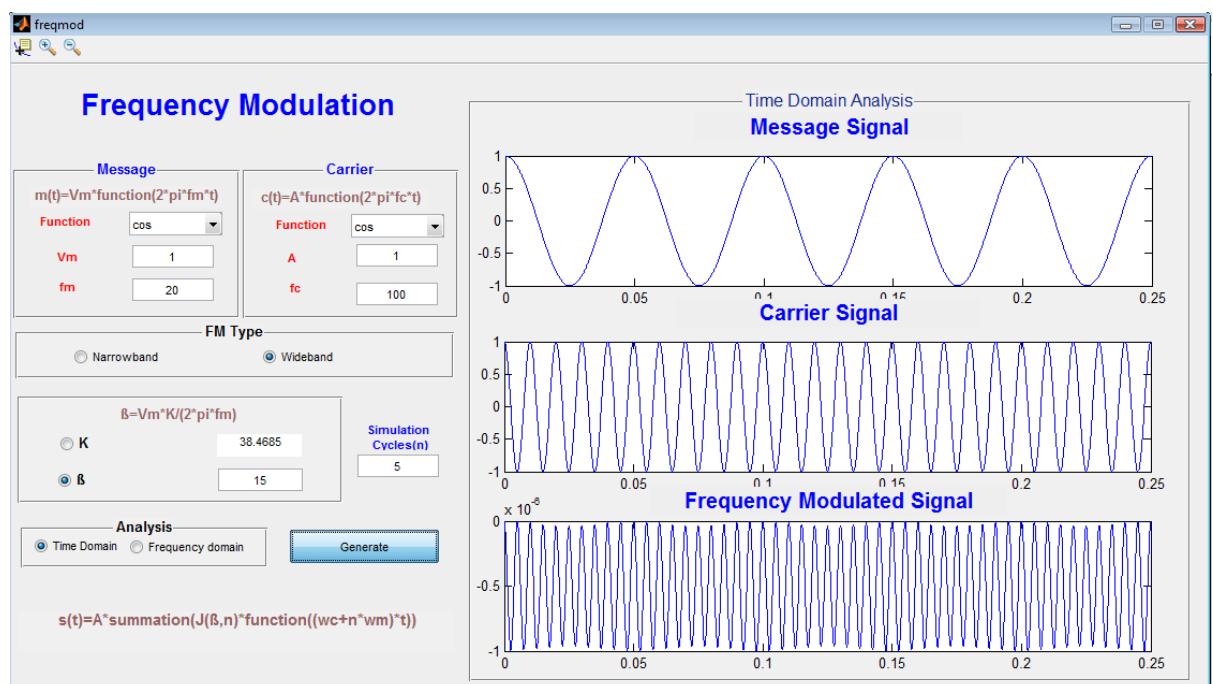


Fig. Time Domain Analysis plot

9. Select **Frequency Domain** radio button in the **Analysis** panel to observe the frequency spectrum.

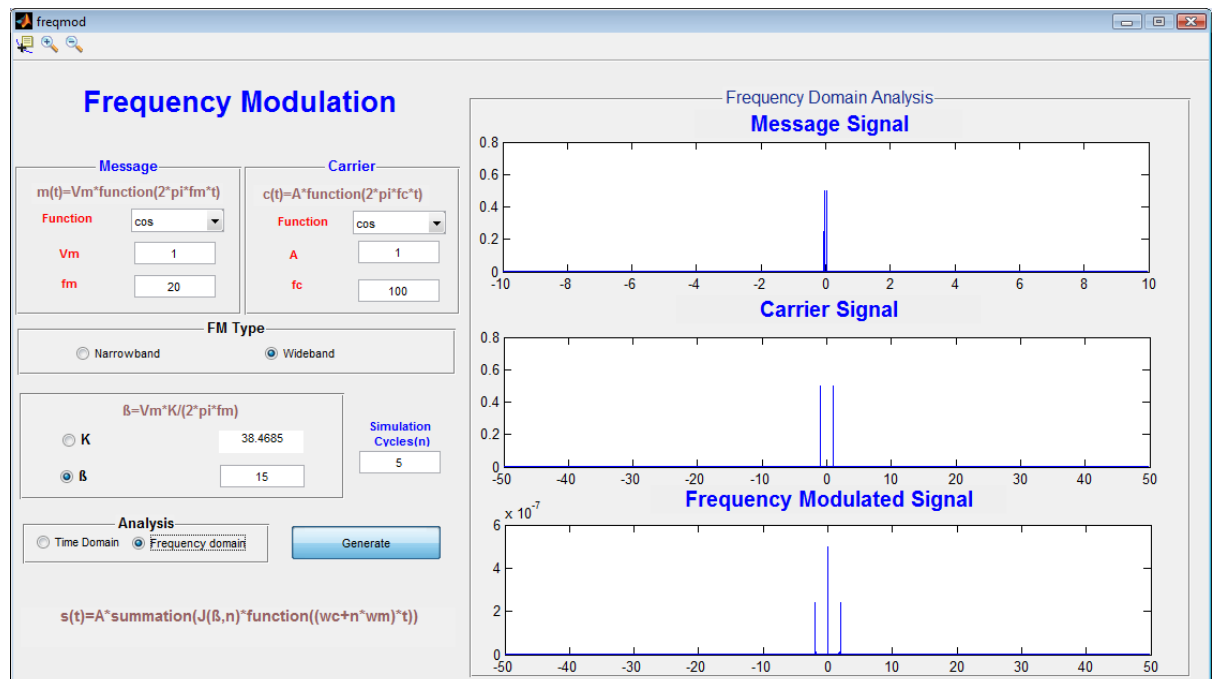


Fig. Frequency Spectrum plot

11. To calculate the bandwidth, use the data cursor. Click on one peak to get coordinates of one peak. To get the coordinates of second peak, **Alt+Click** on the second peak. The difference of X coordinates gives the bandwidth.

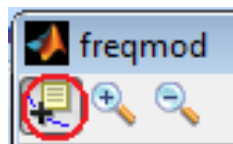


Fig. Data cursor

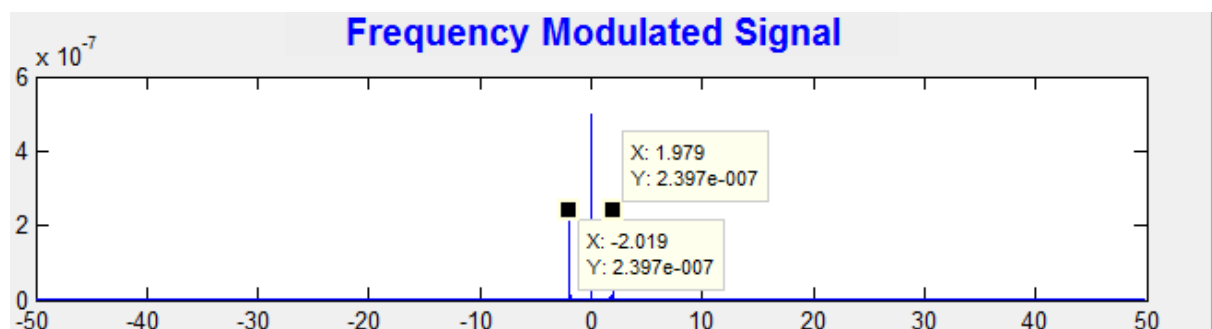


Fig. Markers for bandwidth calculation