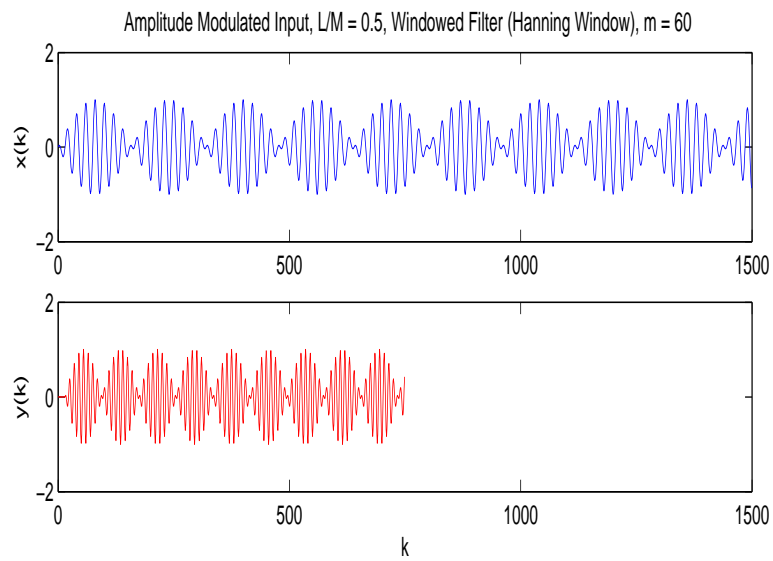


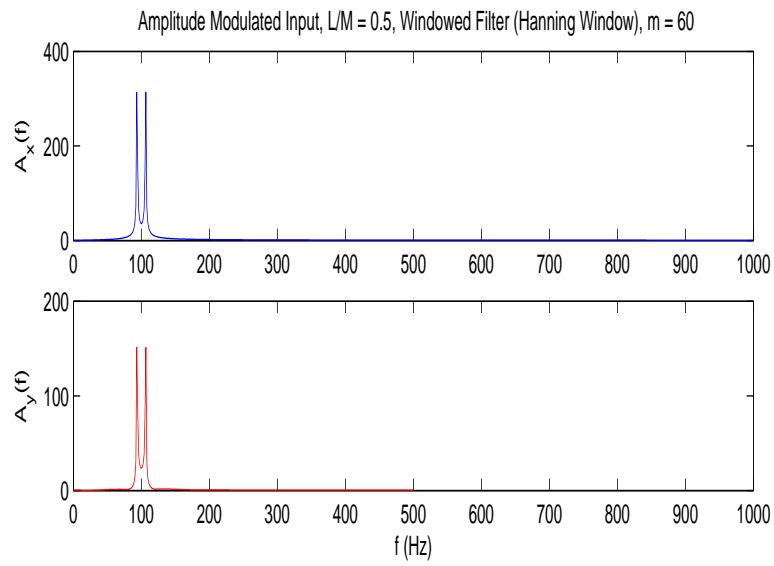
**7.20** Using the GUI module *g\_multirate*, select the amplitude-modulated input. Reduce the sampling rate of the input using an integer decimator with a rate conversion factor of  $M = 2$ . Use a windowed filter with the Hanning window, and plot the following.

- (a) The time signals
- (b) Their magnitude spectra
- (c) The filter magnitude response
- (d) The filter impulse response

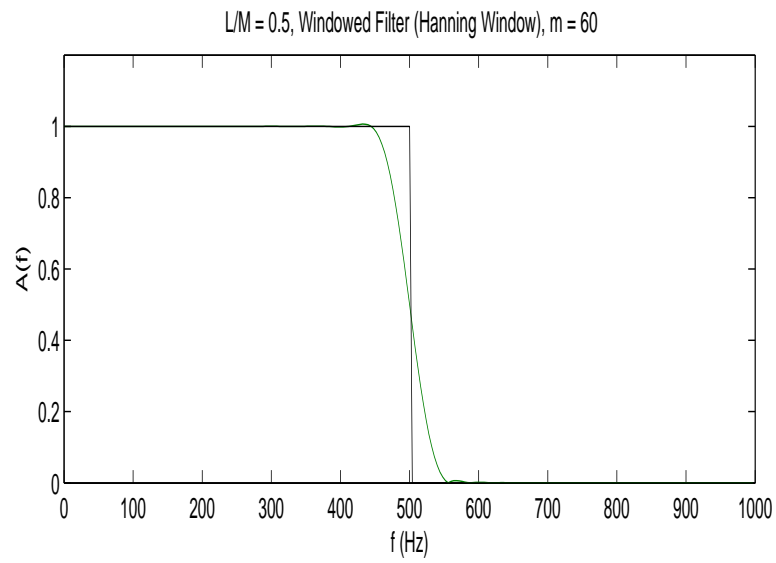
### Solution



**(a) Amplitude Modulated Time Signals**

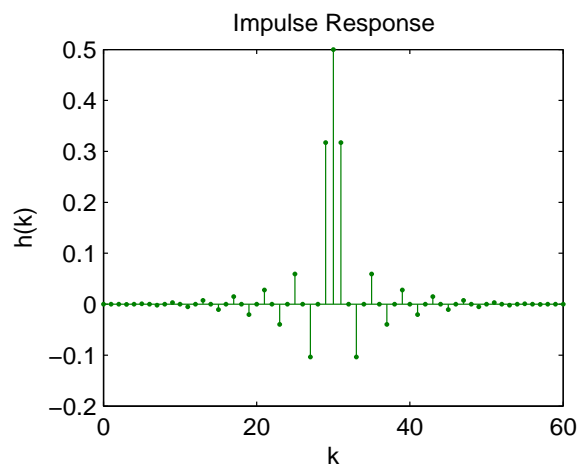
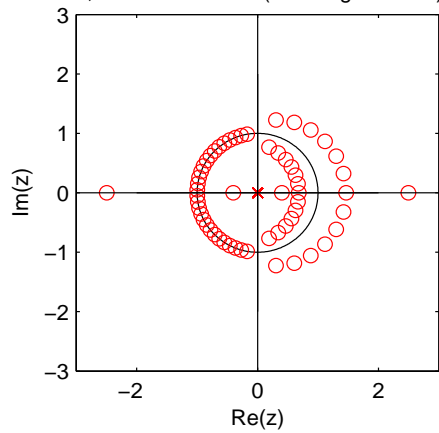


**(b) Amplitude Modulated Magnitude Spectra**



**(c) Anti-Aliasing Filter Magnitude Response**

$L/M = 0.5$ , Windowed Filter (Hanning Window),  $m = 60$



(d) Anti-Aliasing Filter Impulse Response