Digital Signal Processing Assignment # 13
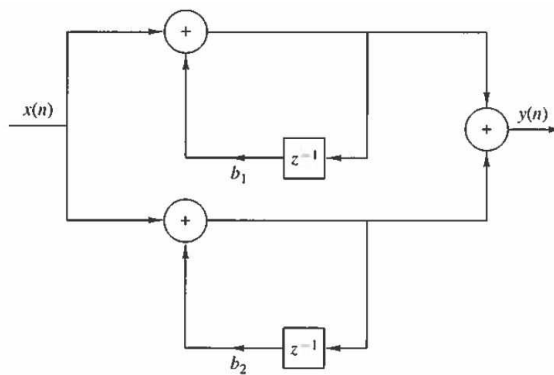
1. Consider the system shown in the following figure.

   (a) Find the transfer function in z-domain.

   (b) Find the difference equation.

   (c) Plot the direct-form II representation.

2. Design an 11-point FIR band-pass filter. The sampling frequency is 44 KHz, and the passband is from 2 KHz to 4 KHz.

   (a) If rectangular window is used, write down the coefficients, and plot with Matlab the amplitude and phase response.

   (b) If the Hamming window is used, write down the coefficients, and plot with Matlab the amplitude and phase response.

3. Using Matlab, design a 4th-order low pass butterworth IIR filter. The sampling frequency is 24 KHz, and the cutoff frequency is 2 KHz. Plot with Matlab the amplitude and phase response.