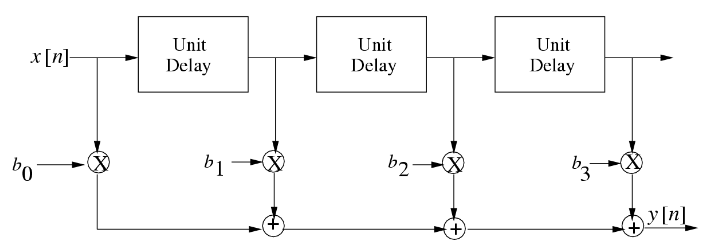
***Seminar 6: FIR Filters***

1. If the impulse response of an FIR filter is: .
   1. Make a plot (versus n) of
   2. Write the difference equation for the FIR filter
2. An FIR filter is described by the following difference equation:
   1. Draw the block diagram of the filter
   2. Compute the impulse response and draw it over *n*
   3. Compute for the complex input signal
3. Assume that we have a linear system for which we do not know the difference equation but we introduce a signal and the obtained output signal is . Using the property of linearity and time invariance compute the output of the system when the input is
4. Let x[n] be the complex exponential . If we define a new signal , it is possible to express in the form . Determine the numerical values of and .
5. For each of the following systems, determine whether or not the system is (1) linear, (2) time-invariant, and (3) causal.
   1. where A and B are constants.
6. If an LTI system is described by the block diagram below, where , , , , determine its impulse response .



1. Consider the discrete time system described by .
   1. Describe in words how the value would be computed from the input sequence.
   2. Suppose that the input is the complex exponential signal . Determine an expression for the output .
   3. Use your result from part (b) to find the output of the above system due to the input .