Example 5-1: FIR Filter Coefficients

The FIR filter is completely defined once the set of filter coefficients $\{b_k\}$ is known. For example, if the $\{b_k\}$ of a causal filter are

$$\{b_k\} = \{3, \ -1, \ 2, \ 1\}$$

then we have a length-4 filter with $M = 3$, and (5.3) expands into a 4-point difference equation:

$$y[n] = \sum_{k=0}^{3} b_k x[n-k]$$

$$= 3x[n] - x[n-1] + 2x[n-2] + x[n-3]$$