

Problem 6.1

The pulse shape $p(t)$ of a baseband binary PAM system is defined by

$$p(t) = \text{sinc}\left(\frac{t}{T_b}\right)$$

where T_b is the bit duration of the input binary data. The amplitude levels at the pulse generator output are +1 V or -1 V, depending on whether the binary symbol at the input is 1 or 0, respectively. Sketch the waveform at the output of the receiving filter in response to the input data 001101001.

Solution

For the input data sequence 001101001, the waveform at the output receiving filter consists of the positive sinc pulse $+\text{sinc}(t/T_b)$ every time symbol 1 is transmitted and the negative sinc pulse $-\text{sinc}(t/T_b)$ every time symbol 0 is transmitted. Moreover, there will be no intersymbol interference present in this waveform because the sinc pulse for a particular symbol goes through zero whenever another symbol is transmitted.