Digital Signal Processing

Lecture (7): Standard Discrete-Time Signals

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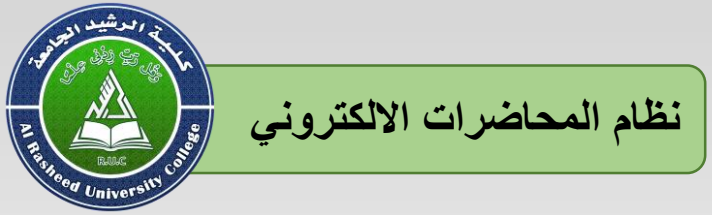

The unit sample signal

This signal defined as δ[n] and is defined as:

$$\delta[n] = \begin{cases} 1 & for\ n = 0 \\ 0 & for\ n \neq 0 \end{cases}$$

In words, the unit sample sequence is a signal that is zero everywhere except at n=0 where its value is unity. The signal is sometimes referred to as a unit impulse. In contrast to analog signal δ(t), which is also called unit impulse and is defined to be zero everywhere except at t=0, and has unit area, the unit sample sequence is much less mathematically complicated.

The unit sample signal

The graphical representation of δ[n] is shown in Figure (1).

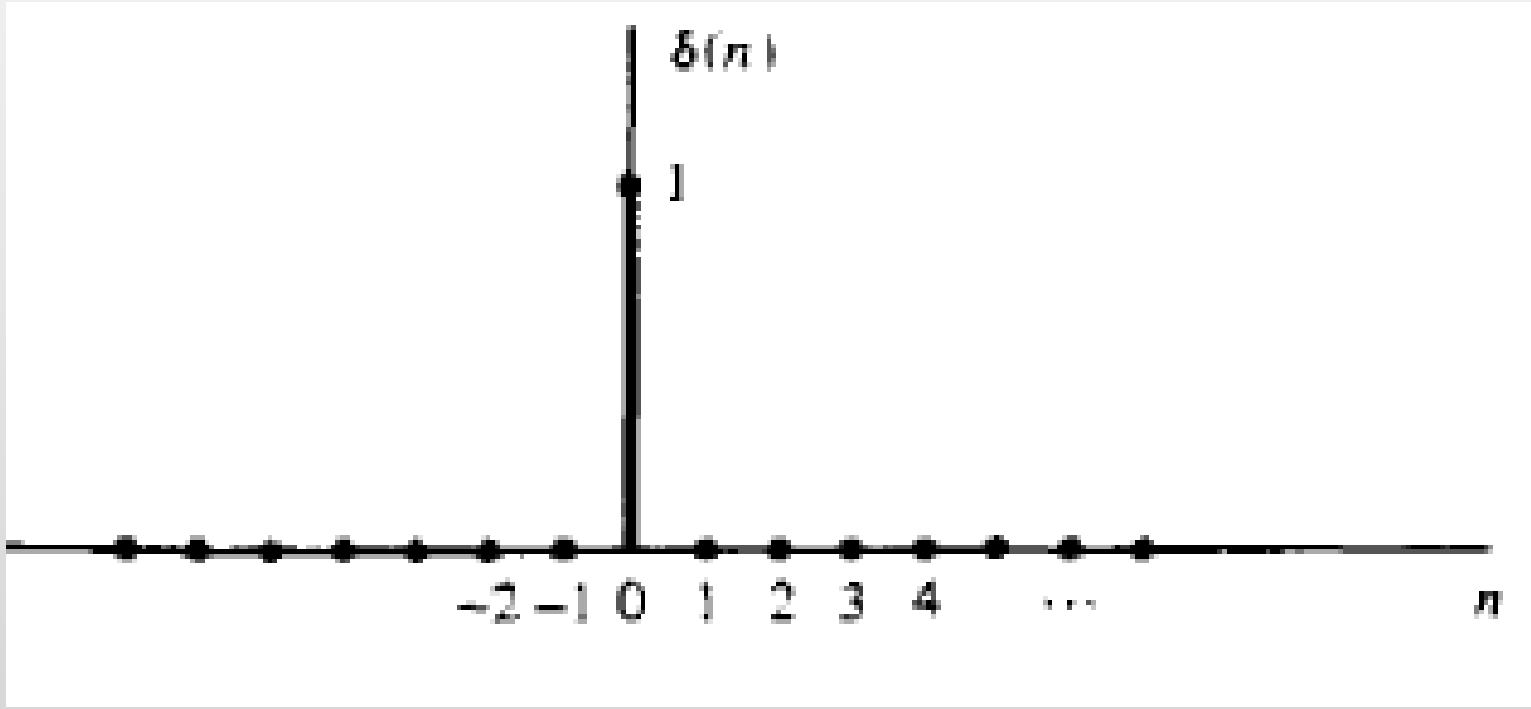

Figure (1): Unit sample or unit impulse signal

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The unit step signal

The unit step signal is denoted as u[n] and is defined as

$$u[n] = \begin{cases} 1 & for\ n \geq 0 \\ 0 & for\ n < 0 \end{cases}$$

The graphical representation of unit step signal is shown in Figure (2).

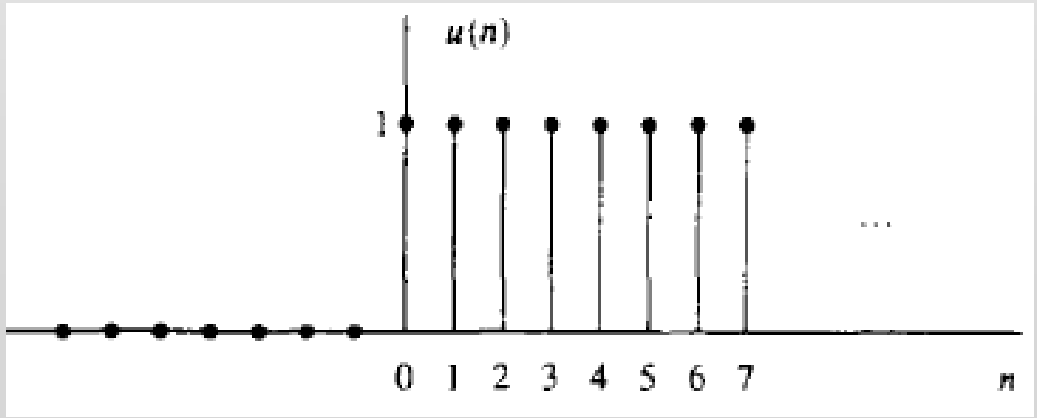

Figure (2): Unit step signal

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