

Nyquist shannon

Technology, Information Technology



Nyquist/Shannon

NYQUIST/SHANNON THEOREM Nyquist-Shannon Theorem The Nyquist Shannon theorem was given the in honor of its two founders; Shannon Claude and Harry Nyquist. It is often referred to as the sampling theory. Sampling simply refers to the conversion of signals, for instance, from a constant space or time function to a distinct space or time function (Lucas, 2000). The theory is essential in the dispensation of signals and telecommunications. The theorem defines that, in case a function does not have occurrences more than B hertz; it is determined entirely by issuing its ordinates at a sequence of points separated by two B in every second (Lucas, 2000). In this case, B refers to the maximum occurrence in the initial signal.

Bandwidth refers to the highest quantity of data which can be transmitted in a given period of time in a communication channel. On the other hand, speed refers to the amount of time it takes to transfer the data to its required target (Lucas, 2000). It requires that in order to have a high speed of transmission of data, the bandwidth should also be high. For low transmission rates the bandwidth should be low

The theorem depicts that after sampling has been done on an analog signal which is band limited, it can then be rightly redeveloped from an unlimited series of samples on condition that the speed of sampling is more than two B samples in every second. However, in case the signal has an element at unerringly B hertz, it is then evident that the samples separated at unerringly two B in every second cannot verify the signal entirely.

If the sampling system does not meet the conditions of the theorem, a

number of elements with maximum frequencies in the input of the analog signal will not be properly characterized in the output of the digital signal (Lucas, 2000). Attempt to convert digital to analog signal will lead the appearance of wrong frequency elements that did not exist in the initial signal. This alteration is referred to as aliasing.

References

Lucas, Henry C., Jr. (2000). Information Technology for Management. New York: McGraw-Hill