

Assignment No.5

Problem Statement

Write a program to implement Pulse Code Modulation Technique to transfer a data to other computer.

Theory

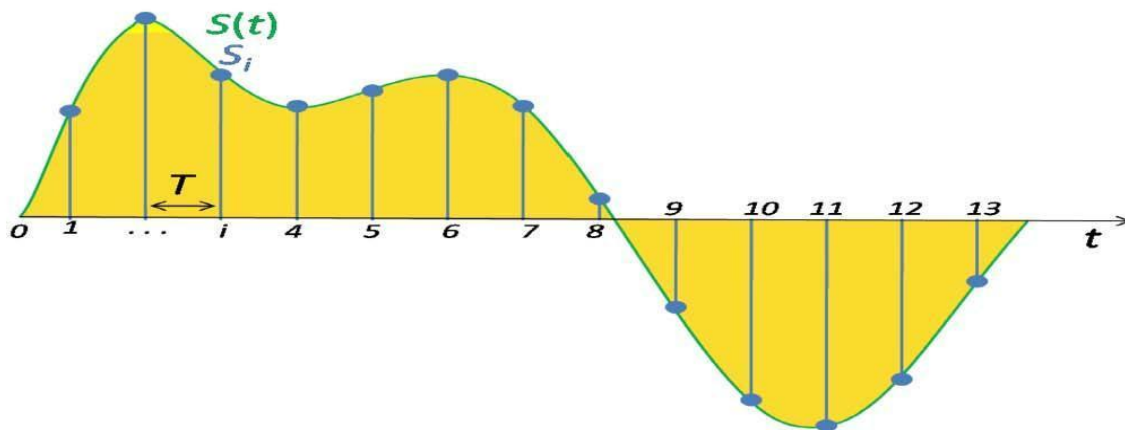
Pulse-code modulation (PCM) is a method used to digitally represent sampled analog signals. It is the standard form of digital audio in computers, Compact Discs, digital telephony and other digital audio applications. In a PCM stream, the amplitude of the analog signal is sampled regularly at uniform intervals, and each sample is quantized to the nearest value within a range of digital steps.

Linear pulse-code modulation (LPCM) is a specific type of PCM where the quantization levels are linearly uniform. This is in contrast to PCM encodings where quantization levels vary as a function of amplitude (as with the A-law algorithm or the μ -law algorithm). Though PCM is a more general term, it is often used to describe data encoded as LPCM.

A PCM stream has two basic properties that determine the stream's fidelity to the original analog signal: the sampling rate, which is the number of times per second that samples are taken; and the bit depth, which determines the number of possible digital values that can be used to represent each sample.

Sampling

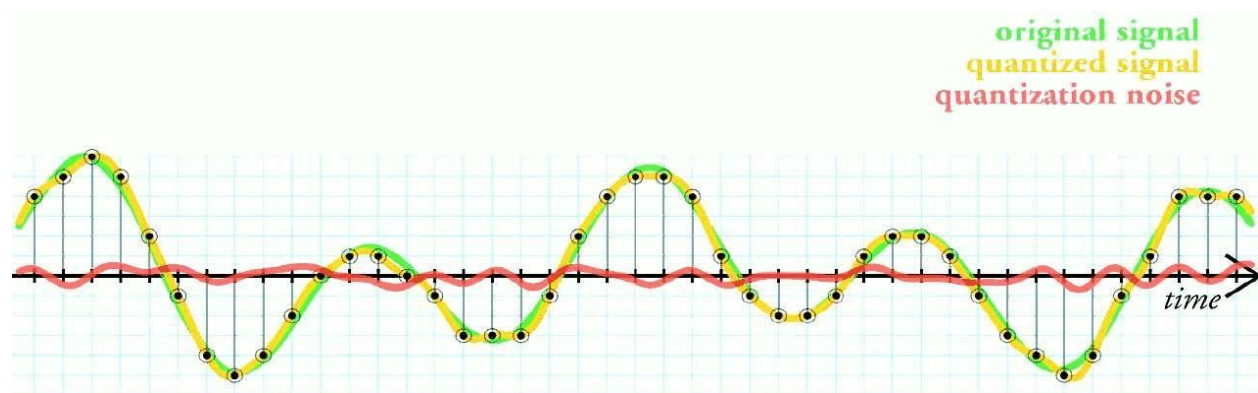
In signal processing, **sampling** is the reduction of a continuous signal to a discrete signal. A common example is the conversion of a sound wave (a continuous signal) to a sequence of samples (a discrete-time signal). A **sample** refers to a value or set of values at a point in time and/or space. A **sampler** is a subsystem or operation that extracts samples from a continuous signal. A theoretical **ideal sampler** produces samples equivalent to the instantaneous value of the continuous signal at the desired point.



Quantization

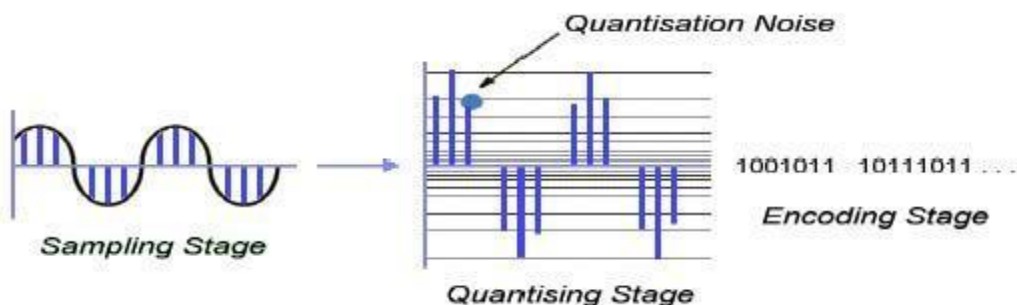
Quantization, in mathematics and digital signal processing, is the process of mapping a large set of input values to a (countable) smaller set – such as rounding values to some unit of precision. A device or algorithmic function that performs quantization is called a quantizer. The round-off error introduced by quantization is referred to as quantization error.

In analog-to-digital conversion, the difference between the actual analog value and quantized digital value is called quantization error or quantization distortion. This error is either due to rounding or truncation. The error signal is sometimes modeled as an additional random signal called quantization noise because of its stochastic behavior. Quantization is involved to some degree in nearly all digital signals processing, as the process of representing a signal in digital form ordinarily involves rounding. Quantization also forms the core of essentially all lossy compression algorithms.



Encoding

Encoding is the process of representing the sampled values as a binary number in the range 0 to n . The value of n is chosen as a power of 2, depending on the accuracy required. Increasing n reduces the step size between adjacent quantization levels and hence reduces the quantization noise. The down side of this is that the amount of digital data required to represent the analogue signal increases.



Conclusion

Hence, we have studied and successfully implemented program for Pulse Code Modulation Technique.