Quantization

Consider an analog signal $x(t)$ which is to be converted into a digital signal in the form of digits.

First we get samples of this signal at different time instants $t_0, t_1, t_2 \ldots\ldots$. At each time instant, samples of the signal are taken.

Now signal is a discrete time signal which is defined only at sampling instants.

However, since the magnitude of each sample can take any value in a continuous range, signal is still an analog signal.

This difficulty is resolved by a process known as quantization.

In Quantization, Total amplitude Range which a signal may occupy is divided into a no

of standard levels.

As shown in Fig 3, amplitude of signal $x(t)$ lies in the range $(-m_p, m_p)$ which is divided into L intervals each of Magnitude $\Delta v = \frac{2m_p}{L}$.

Now each sampled is rounded off to the nearest quantized level as shown in Fig 3.

Now Info is digitized.

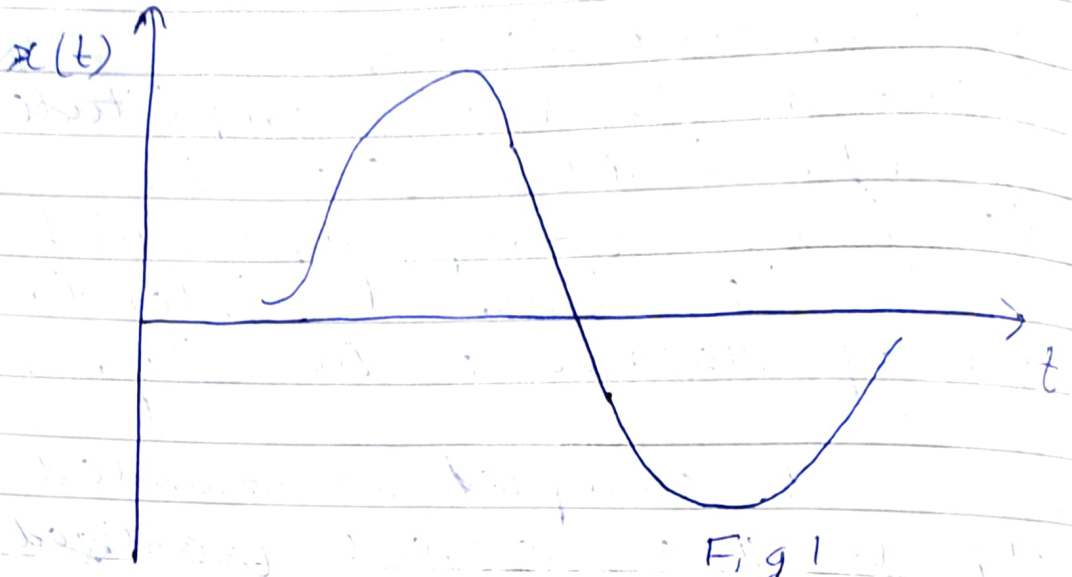
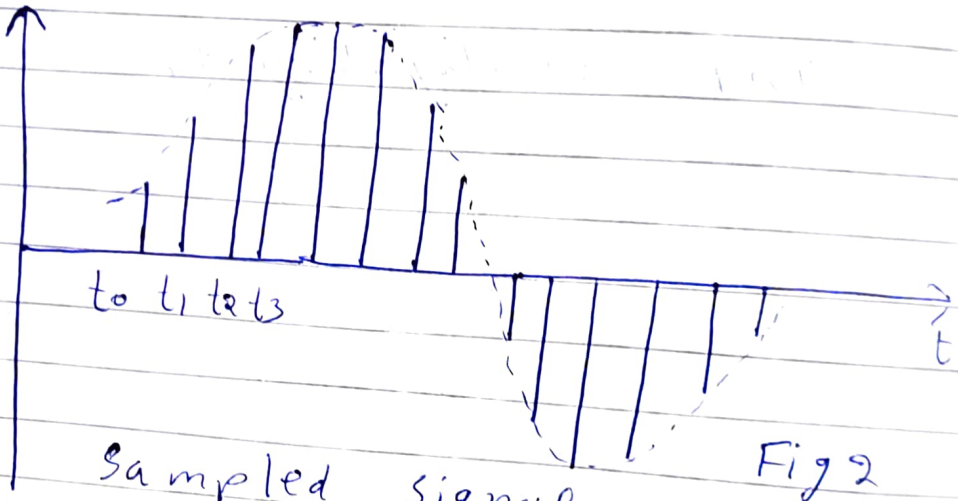


Fig 1



Sampled signal

Fig 2

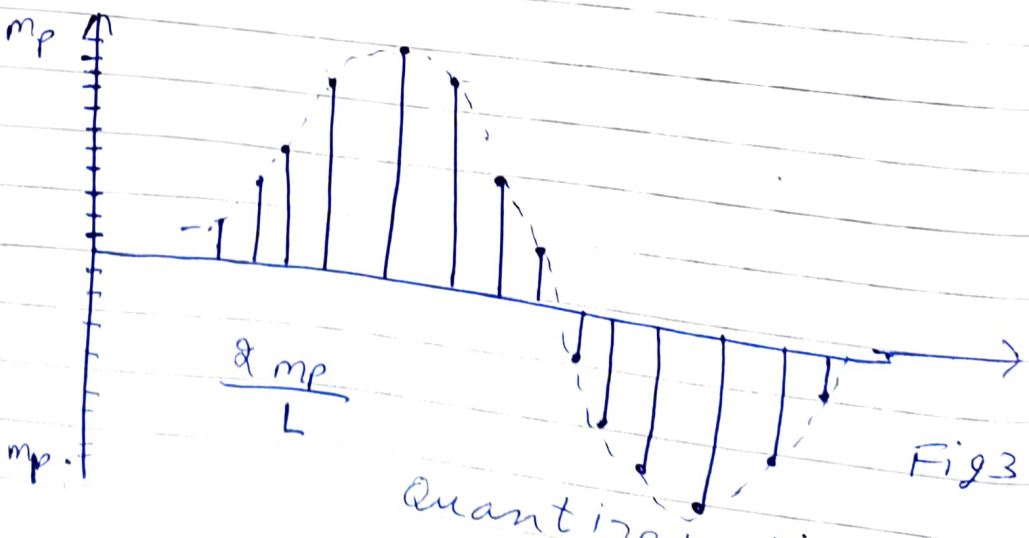


Fig 3

Quantized signal