

Verification of Sampling Theorem

The Sampling Theorem, also known as the Nyquist-Shannon Sampling Theorem, states that a continuous signal can be completely reconstructed from its samples if the sampling frequency is greater than twice the highest frequency present in the signal. This critical frequency is known as the Nyquist rate. $f_s \geq 2f_{max}$ Where: • f_s is the sampling frequency (rate at which the signal is sampled), • f_{max} is the highest frequency present in the signal.

Applications:

- Digital audio and video processing
- Communication systems
- Image processing
- Medical imaging