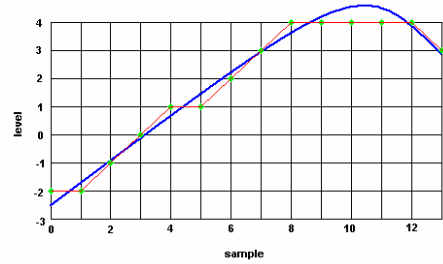


Digitisation

- Conversion of a continuous electrical signal to a digitally *sampled* signal
- Analog-to-Digital Converter (ADC)
- Sampling rate/frequency, e.g. 10 kHz
- Degree of quantisation, e.g. PCM 8 bit precision
- Nyquist frequency
 - Aliasing

1

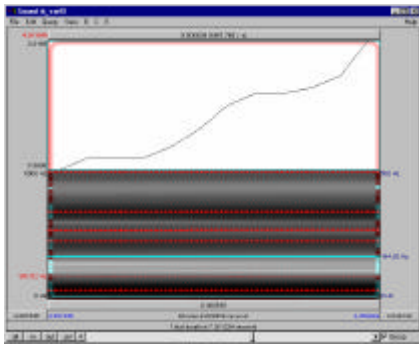
Quantisation



Note: Can have non-linear level separation or variable-length codewords

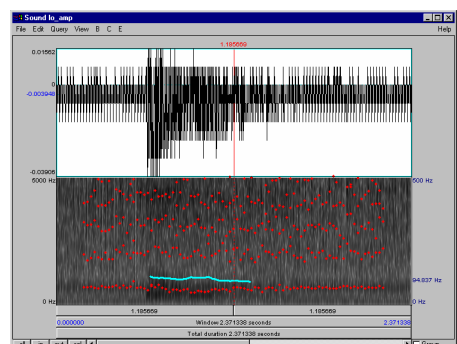
2

Sampling



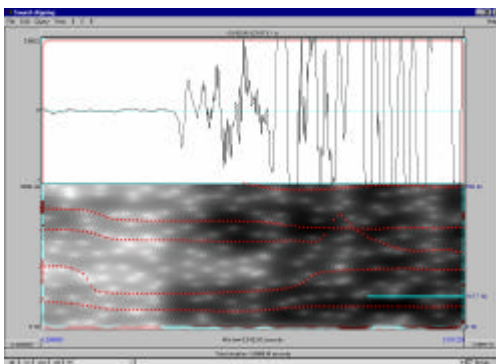
3

Quantisation noise: greater at low recording levels



4

Clipping: occurs when recording level too high



Nyquist's Sampling Theorem

- "If highest frequency component in a signal is f_h , then the sampling frequency must be at least twice this value" (Owens,93) to be able to reconstruct the signal.
- I.e. $F_s \geq 2f_h$
- If $F_s < 2f_h$
 - Aliasing occurs
 - Reconstructed signal is distorted

6

How do we choose F_s ?

- We would like to keep F_s as low as possible. Why?
- What frequency band contains most of the information of interest?
- Filter outside band of interest
- Sample at rate $>$ highest frequency in band of interest
- Why are CDs sampled at 44kHz?
- Analog telephone bandlimited:
300--3.3kHz ,

Preprocessing for Speech

