

Signals and Communication II.

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Quantization

- ▶ Sampling a continuous time signal results in samples that can take any value
- ▶ In communication applications, these signals will be perceived by human beings and our senses have limited resolution
- ▶ Quantization maps the continuous samples to a finite set of values

Examples

- ▶ Consider the signal $x(t) = A \sin(2\pi t)$ and assume we sample it at a sampling rate of $f_s = \frac{1}{T_s}$.
- ▶ To store or transmit this signal, we must map the samples to a set of finite amplitudes.
- ▶ Assume we are to represent each sample using one bit. Suggest a possible input output mapping

Examples

- ▶ Now assume we have two bits
- ▶ How many values can be represented?

Binary representation

- ▶ Quantisation levels can follow a midtread or midrise pattern
- ▶ For each level a binary representation is chosen
- ▶ For example we can use a two's complement representation