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1   Results & Discussion

1.1   The Discrete Fourier Transform (DFT)

Given a signal, $x[n]$, it's N-point DFT is given by

$$X_k = \sum_{n=0}^{N-1} x[n] W_N^{kn} \tag{1}$$

where $W_N = e^{-j2\pi/N}$. The discrete Fourier transform is the sampled version of the discrete time Fourier transform (DTFT), which is a continuous function. More specifically, the N-point DFT contains N samples from the continuous DTFT.

For example, consider the signal $x[n] = (-1)^n$ for $0 \leq n \leq N - 1$. Its N-point DFT is given by 1

1.2   The Z-Transform

Given a discrete signal, $x[n]$, its z-transform is given by

$$X(z) = \sum_n x[n] z^{-n} \tag{2}$$

where z is a complex variable.

1.3   The Inverse Z-Transform

2   Conclusions