DSP HW2.

Quantization and analog-to-digital conversion

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Goal

The goal of the assignment was to analyze quantization of raw data about voltage and processing of the signal to achieve noize reduction. As a result we have a voice sample with legible speech.

Steps

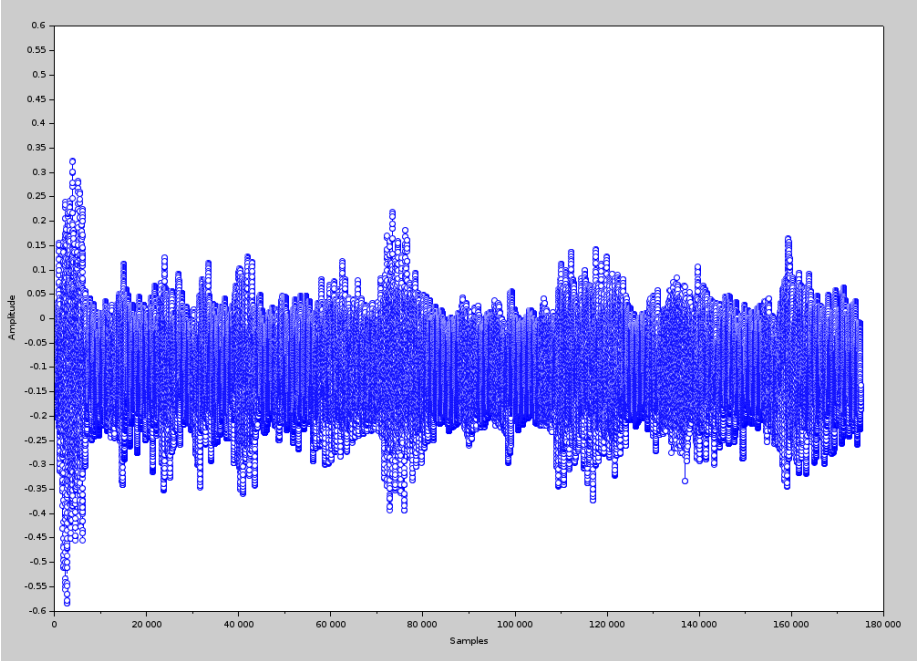
All the values are found empirically.

- **Quantization** - mapping from continuous set of values to the set of quantum levels
  Ended up with $\{-1, . . , -0.5005, -0.5010, . . , 1\}$
- **Frequency of sampling** - how many times the signal is recorded in 1 second.
  Ended up with $fs = 50000$
- **Amplitude shift** - to balance value by compensating shift from 0
  Ended up with a value of 0.1
- **Eliminating sinusoidal interference** - to compensate noize we subtract sinusoidal waveform
  Ended up with frequency as 210Hz and amplitude as 0.1

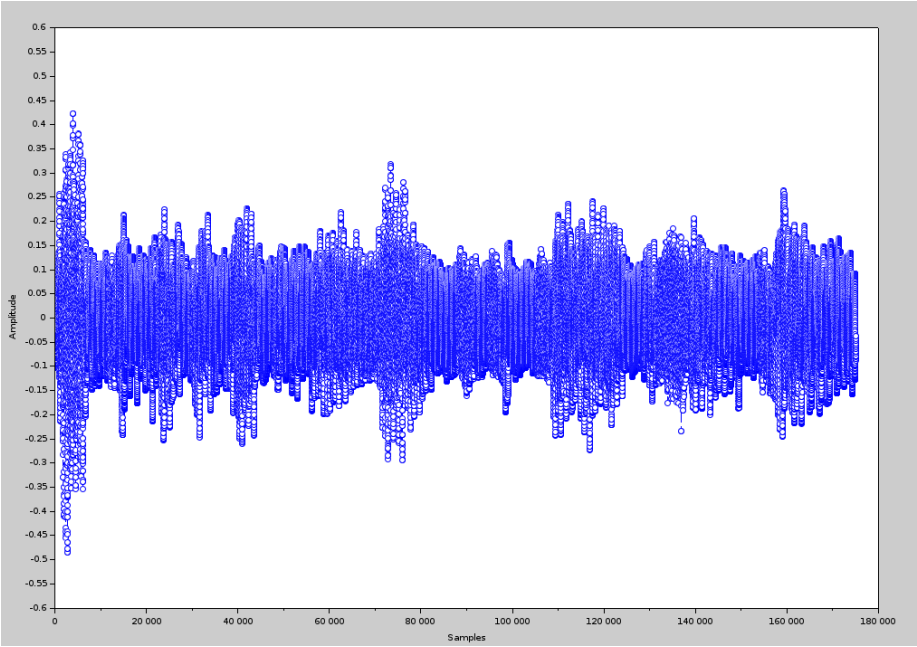
Plots

X axis - Samples, Y axis - Amplitude

- Quantized:



- Shifted:



- Sinusoid eliminated: