ECEN 489: Data Conversion Systems & Circuits

Lab 2: Signal to Noise Ratio, Quantization

Joseph Nguyen
02/28/2025
931006629
https://github.com/josephknguyen02/ECEN489/tree/main

Lab Experiment:

Part 1:

For this lab, I began by using the AD2 AWGs to generate a sine wave signal as in the pre-lab. I then plotted the PSD of the sine wave and graphically measured the SNR of the system which is shown below.

Here we can see that the SNR is about 93.86dB which corresponds to an ENOB of about 15 bits.

Part 2:

Next, I proceeded by building the summing op-amp circuit using two inputs for the sine signal and noise signal v_1 and v_2 respectively. For the resistor values, I set the gain of the op-amp to 2 and used a 20k resistor for R_F and $R_{1,2}$.
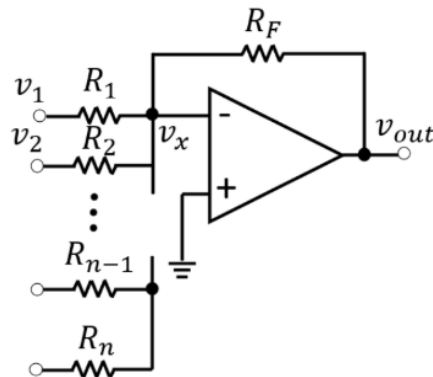
Below is the time domain plot and PSD plot of the output signal respectively.

We can see that the SNR decreased to about 60.77dB which corresponds to an ENOB of about 10 bits