

Lab 2: Statistical Functions and plot Histograms

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Abstract—This document shows how MATLAB was used to gain experience using the statistical functions provided to process digital signals. Participants analyzed data using MATLAB commands to find data such as a samples max, mean, and standard deviation as well as explored the use of the histogram function to estimate and characterize the probability density function of random variables.

I. INTRODUCTION

MATLAB gives users access to statistical functions that can be used to process data in various ways. Here methods such as std were used in order to find values that would help important information such as the signal to noise ratio (SNR). Plots were used to visualize the difference between quantized and quantized error signals.

II. METHODOLOGY

The procedure started with loading given data from a .mat file into the MatLab workspace. With the give data the max, minimum, and mean values were found along with the standard deviation and variance.

```
1 clear
2 load Lab2_Chapter2_Section1.mat
3 [sample, signal]
4
5 maxSignal = max(signal)
6 minSignal = min(signal)
7 avgSignal = mean(signal)
8 stdSignal = std(signal)
9 varSignal = var(signal)
```

The values loaded from the .mat file were used to create a plot and histogram.

```
1 figure
2 plot(sample, signal, 'LineWidth', 1)
3
4 % Solution -- Place your code to label the axes
5 % and title the graph
6
7 grid on % Display or hide axes grid lines
8 hold on % Retain current plot when adding new
9 % plots
10
11 title('Signal versus Sample') % Custom title
12
13 % Axis labels
14 xlabel('Signal')
15 ylabel('Sample')
16
17 legend('Signal') % Legend to show which lines
18 % are which
19 hold off
20
21 histogram(signal)
22 grid on
```

```
title('Signal Histogram') % Custom title
% Axis labels
xlabel('Signal')
ylabel('Frequency')
```

III. RESULTS

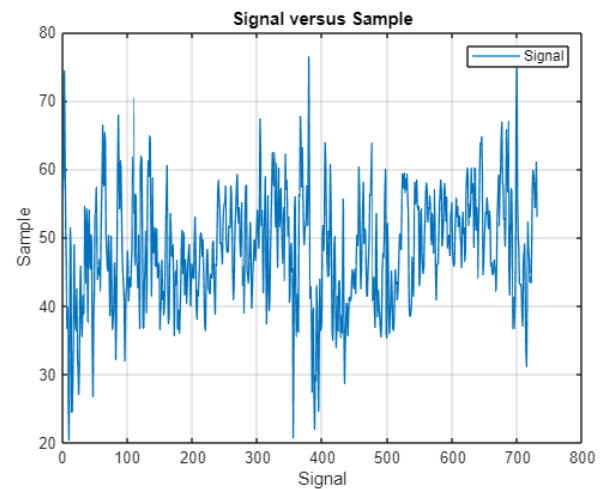


Fig. 1: Original Signal

In Figure 1, the original signal is plotted against the samples. This plot allows the max and minimum sample number to be estimated by observing the figure.

		Values
1	Maximum	76.4106
2	Minimum	20.4169
3	Average	48.1501
4	Standard Deviation	8.3260
5	Variance	69.3218

Fig. 2: Table with the estimated values

The values from the max, min, mean, std, and var functions were inserted into this table. These values were used to compare the accuracy against the histogram with teh actually values.

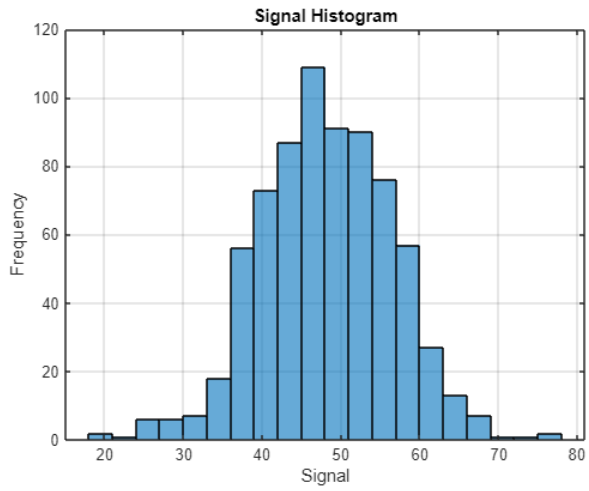


Fig. 3: Histogram of the actual values

This figure shows a histogram with the actual statistical values. With this graph we can

IV. ANALYSIS

Matlab makes me wanna jump infront of a moving car.

V. CONCLUSION