LAB #4 Calibration of the Water Tank

PREPARED BY:
HADEN SANGREE
AUSTIN DONNELL
KYLE GANTEK
SHARUN SRIPATHY
SEAN GOSNELL

IN FULFILLMENT OF THE REQUIREMENTS FOR:
MTRE 4002L

APRIL 8th, 2022

College of Engineering
Kennesaw State University
Marietta, GA

Contents

1. INTRODUCTION

The goal of this lab was to calibrate a water tank using a premade Simulink file give. We did this by filling a tank, and then recording the height of water in the tank and the corresponding voltage of the pressure sensor at the bottom of the tank.

2. QUESTION 1

Below in Table 1 shows our voltage values to the corresponding water level of the tank.

Table 1

h (cm)	24.8	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6
V_s (V)	3.397	3.355	3.27	3.194	3.100	3.038	2.946	2.873	2.794	2.703	2.601	2.534	2.447	2.351	2.266	2.175	2.099	2.015	1.932	1.832

3. QUESTION 2

Below is our modified MATLAB code, which contains the values in Table 1.

```
clc;clear all;close all;

x=[3.397 3.355 3.270 3.194 3.100 3.038 2.946 2.873 2.794 2.703 2.601
2.534 2.447 2.351 2.266 2.175 2.099 2.015 1.932 1.832];
y=[24.8 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6];
n=length(x);
plot(x,y,'*')
A=[x',ones(length(x),1)];
B=y';
a=(A'*A)^-1*A'*B;
yy=a(1)*x+a(2);
hold on
plot(x,yy)
```

4. QUESTION 3

Below Figure 1 displays a plot of the data we collected in Table 1. This plot also includes a best fit linear line with an equation to describe it. This equation proved to be accurate as we tested out results.

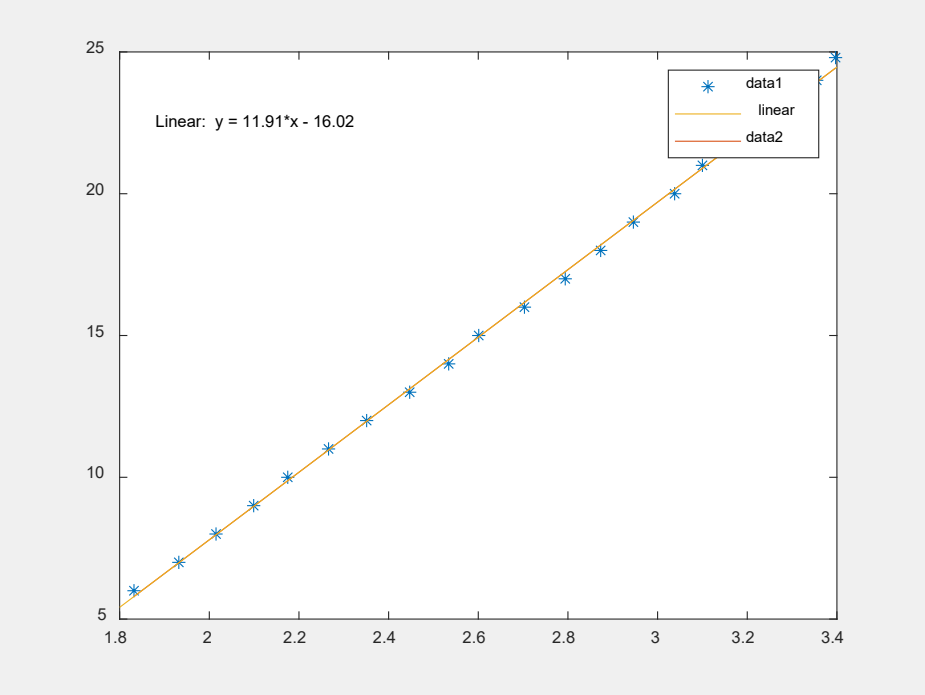

Figure 1

5. CONCLUSION

In conclusion, this lab was a great exercise with showing how to integrate Simulink with a physical system, in this case a water tank. We learned how to calibrate the level of a water tank in terms of the pressure sensor in the tank.