Prelab

Problem 1

sin^2(theta) = (1-cos(2*theta))/2

Problem 2

Differential linearity refers to the degree to which the relationship between an analog input and its corresponding digital output in a digital-to-analog converter (DAC) or analog-to-digital converter (ADC) follows a straight line. In simpler terms, it measures how well the output changes in response to a small change in the input. A system with high differential linearity accurately represents the analog signal in its digital form.

Problem 3

There are two tests for linearity

additive: S(x_1 + x_2) = S(x_1)+S(x_2)

homgenaity: S(kx) =kS(x)

Lab 2

Joshua Ayers	Date:
TA sig	
Parners	
Seiya	Veenstra
Steve	Freinstein

Objective

The objective of this experament is to anilize linear systems

Materials

NI ELVIS II

EMONA SIGEx Signal & Systems add-on board

Assorted patch leads Two BNC – 2mm leads

Results

Table 2.1

Input Amplitude	LIMIT Amplitude	REC Amplitude
1	3.2	0.66
2	3.25	1.25
3	3.25	1.72
4	3.35	2.2
5	3.35	2.25
6	3.34	2.75
7	3.34	3.26
8	3.34	3.7
9	3.34	4.2
10	3.34	4.68

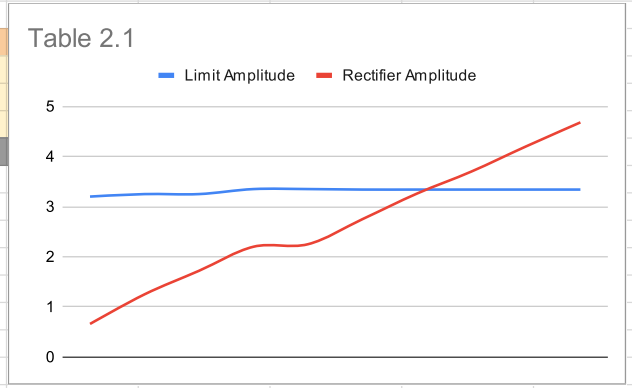
Table 2.2

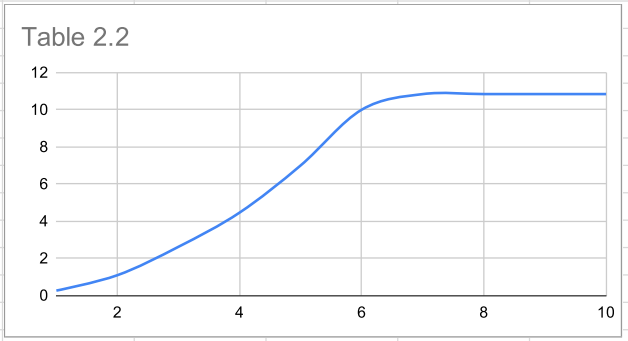
Input Amplitude	Mult Amplitude
1	0.26
2	1.09
3	2.62
4	4.46
5	7
6	10
7	10.84
8	10.84
9	10.84
10	10.84

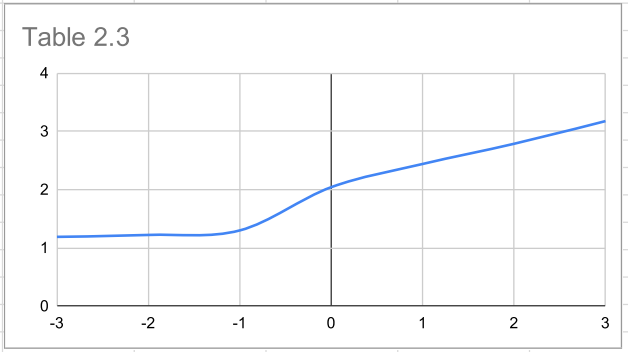
Table 2.3

Input Voltage	Output frequncy(kHz)
-3	1.188
-2	1.221001221
-1	1.298701299
0	2.040816327
1	2.43902439
2	2.78551532
3	3.174603175

slope = 9







Formula =	2* intg(0,0.5,9t)

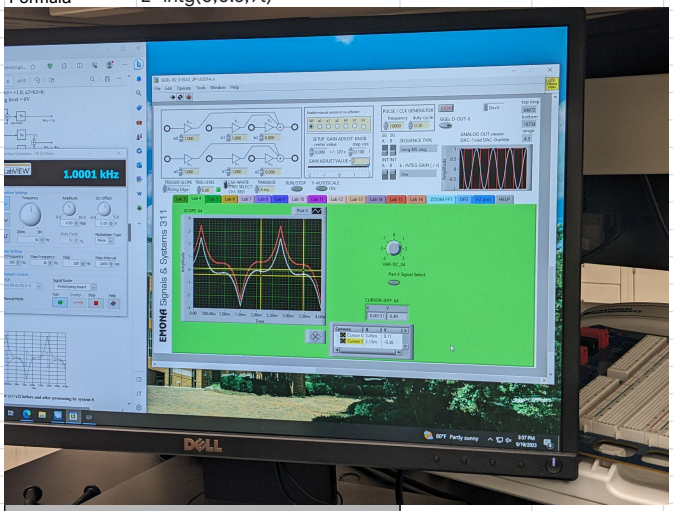


Table 2.4		
Input Freqency	Square wave	Sin wave
1000	0.99	0.99
2000	0.99	0.99
3000	0.99	0.99
4000	0.99	0.99
5000	0.99	0.99
6000	0.99	0.99
7000	0.99	0.99
8000	0.99	0.99
9000	0.99	0.99
10000	0.99	0.99

Conclusion

I learned about linear systems and their implementation in cuircuits.