Feedback controller in the Mixed Singal Device

Tries to drive the average difference to be equal.

Integral Controller

For a twelve bit machine you have to guess 12 times.

All the resistor values are equal in the analog to digital methods

The higher the resistor value the less power it takes and the lower it is the less noise.

If sampling at 240Hz

|  |
| --- |
| Current Sample t |
| t- 1/240 |
| t-1/120 |
| Oldest Sample t-3/240 |

A+Bcos(2pi\*60t+phi)

If A is my singal, and B is the noise.

You can’t do (V[0]-V[2])/2 = y. Because this would get rid of the A.

Whats the relationship between time jitter and voltage error?  
Slew Rate

Look at the slope of the singal we are trying to sample, then we multiple it by the time and that is our voltage error.

Trying to take a picture of something moving, that is jitter.

Resolution is the smallestest difference we can resolve.

To measure resolution we are measuring repeatability, and we take the sigma of that as an approximatation of what we want.

Transducer noise and Electrical noise are the dominate factors in our ability to measre the same thing again and again.

Our lab 9 is going to jitter nless we throw the last digit away. The last digit on our thermonnitor will oscillate.

Only equation that works with temperature is Maximum error (with units of x) = max |xn-xmi|

X represents temperature

N is the number of data collection

T stands for truth

We should have an INA122P

-not an OP amp, it is an instrumentation amplifier

Low Pass Filters:

Two reasons why we want a Low Pass filter:  
Anti Aliasing

Connec tour spectrum analyzer and connect it to both the input and output of the low pass filter to see if we have aliasing.

To get rid of alaiasing add a low pass filter.

Use the started Excel file to figure out values for Resistors and Capacitor of the low pass filter.

C1 = 2x C2.

R = R.

For 10 fc. Make C1 .44uF and C2 .22uF and 51k for the resistor. (this is for noise reduction)

-this makes a 2 pole Low Pass Filter

Sequencer- what the ADC is using to sample.

When you first want data for the ADC what do I do?  
-tell the sampler how fast you want to sample

The interrupt grabs data from the fifo

What tells the fifo that you want data?

The timer interrupt-

The process of the timer telling the ADC you want data is called triggering, it is triggering the sequencer to measure the ADC value

What other ways could you use to measure the ADC value?

You could have used Input Capture/Edge Trigger.

Periodic Trigger too