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**ECE 479/579 Digital Control Systems**

**Homework Assignment #4**

1. The gains of a valid DAQ (Data Acquisition) device are 1, 2, 5, 10, 20, 50, and 100, and ranges of the DAQ are –10V to +10V, and 0V to +10V.

I. You want to measure a signal that varies between +0.5V and +1V, and you need to detect a change of 0.5mV.

 Determine what range the ADC will use.

 Determine the gain that the DAQ will apply to maximize the signal within the chosen range.

 Determine what code-width the DAQ device needs to detect a change of 0.5mV.

Since the signal varies between positive range,so





**Resolution=0.5mV.**





II. For a signal that varies between 0V and +5V, answer the following questions:

a. What range should you choose for your ADC?

**ADC Range=[0V,10V]=10V**

b. With the range from the previous question, what gain will be applied?



c. For the gain and range you obtained, what is the smallest voltage change a 12-bit DAQ can detect?

