ECEG 201 – Homework 05 Due on 2020-02-21

All of your answers should be given in engineering format, using the correct symbols for the unit and prefix. If you round an answer, keep at least three correct significant digits. Show your work for calculations.

- 1. The microcontroller used in the Arduino Uno has a 10-bit analog-to-digital converter. Suppose that the analog reference voltage is exactly 4.096 V.
 - (a) What is the voltage resolution of the ADC?
 - (b) What is the decimal digital value that you expect to read from the ADC if the input voltage is exactly 1 V?
 - (c) What is the input voltage that should cause the digital output value to be 768? Express your answer with at least **four** significant digits.
- 2. If an ADC with a 12-bit digital output uses $V_{REF} = 5.000 \text{ V}...$
 - (a) What will be the decimal value of the digital output value when the input voltage is 0.631 V?
 - (b) What input voltage would produce an digital output of 1792? Express your answer with at least **four** significant digits.
- 3. Suppose we need a resolution of no more than 1 mV when using an ADC with $V_{REF} = 3.3 \text{ V}$. What is the minimum number of **bits** of resolution (i.e. the value of N) we need in the converter?

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