Speed sensing:

1. Understand what I am provided with to measure the non-line factors; how they work, capabilities and how the microcontroller will get measurements
2. If I plan to use them then how will I implement them
3. If I want an alternative then how will this alternative help me and discuss any ones that I will purchase to beat competitors

Understand what I am provided with to measure the non-line factors; how they work, capabilities and how the microcontroller will get measurements

EEE school has provided us with an incremental magnetic encoder called the AEAT-601B-F06. Incremental magnetic encoders measure motion and direction by using two sensors at two different positions relative that measure change across a code disk. The code disk has fixed shafts that are fixed distances from each other like the stokes on a bicycle wheel and these allow the signals to flow through causing a rising edge. Once blocked by movement across the code disk it causes the detector to lose the signal and output a logic 0 causing a falling edge. This allows the measurement of speed of the wheel because speed using the counts per second, the position of the sensor relative to the code disk and the counts per revolution. The counts per second are measured by first

The quadrature allows detection of direction also and detection of direction uses two sensors, A and B, that are placed so that when there’s motion, they detect a rising edge at a 90- degree phase difference so one would detect a rising edge after a ¼ of the time period. When rotation is clockwise, the 90-degree difference is positive meaning that A is detecting after B and anticlockwise so 90-degree difference is negative so A is detecting before B.

The STM32 microcontroller will get the signals from the encoder via the TIM2 or TIM5 general purpose timers in which are chosen because of their 32 bit quadrature encoder support interface

If I plan to use them then how will I implement them

The quadrature will connect to the stm through its rail with A, B, index connecting to … and GND connecting to

The software will do the following; using input capture mode, the TIM 2 counter will intialise the timer to 0 and counter cleared. The timer will start and counts recorded and after a specific period an interrupt occurs that stops the counting and the time of input is recorded. The process is restarted for a second time and then we have two count-time values and using output compare mode and equation 1 we get speed. For direction, we use output compare to compare the times of rising edges of A and B to see which one leads and hence we get the direction.

Current sensing:

Two motors need two different current sensing circuits. The motor drive board has a current amplifier circuit that is used to input voltage into the microcontroller for measurement. First the current of the motor flows across the 0.1 resistor in series with the motor. This resistor is connected to the current amplifier circuit so current flows through and the voltage of the 0.1-ohm resistor is inputted into the aplc-c784 Vin+ by using isense resistor path and ground is Vin-. The voltage that is outputted is the difference between between Vin+ and Vin- which is just the voltage of the 0.1 ohm resistor. After which we can use equation … to get current.

If I want an alternative then how will this alternative help me and discuss any ones that I will purchase to beat competitors