RBE2002 Review Session

November 20th 2023

1. Using C++, calculate the ICC position given the romi wheel speeds, wheel track, and pose. Then print it out.

```cpp
// Wheel Track in mm
const float w_track = 200;

// These variables are being updated elsewhere, you can use them as
    is
// Current x (in m), current y (in m), current theta (in deg)
float curr_x, curr_y, curr_th;

void RomiChassis::print_ICC(float speed_l, float speed_r){
    /*
    Calculate the ICC position from the Romi pose, and wheel speeds
    */

}
```
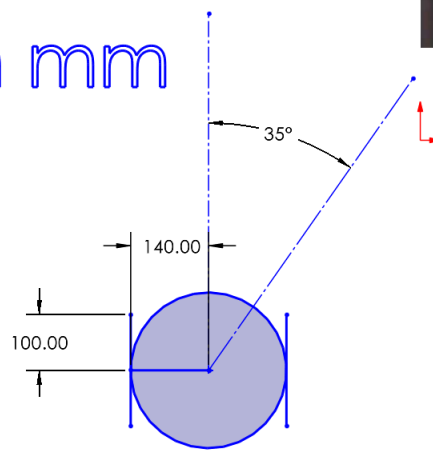
2. You have your romi set up to look at cool birds. You know there's a cooler bird 35 degrees to the right of where the romi is currently looking. The romi has a 35:1 gearbox. One revolution of the encoders magnetic disk is 700 counts. How many encoder counts does each wheel have to spin to do a point turn to look at the cooler bird?

All units in mm

35°

140.00

100.00

3. When powered by 5v, the photosensor has a transfer function of

$$Vout = 1.5V + 15mV * L$$

Where Vout is in volts and L is light in lux. You intend to sample the sensor with an ADC that will have a reference voltage of 3.3V. What is the max lux that can be registered?

4. Consider another photosensor that has been placed in series with a 20k resistor. The system uses a reference voltage of 3.3v and the resistance of the photosensor can be described with the transfer function below.

$$Rf = 10k\Omega + 10\Omega * L$$

Where Rf is the resistance in ohms of the photosensor and L is the light sensed in lux. What is the voltage measured by the photosensor if it is given 200 lux?

5. Using your answer from the last slide, what is the ADC value registered if a 10 bit ADC is attached to the photosensor?