Lab 1. Encoders

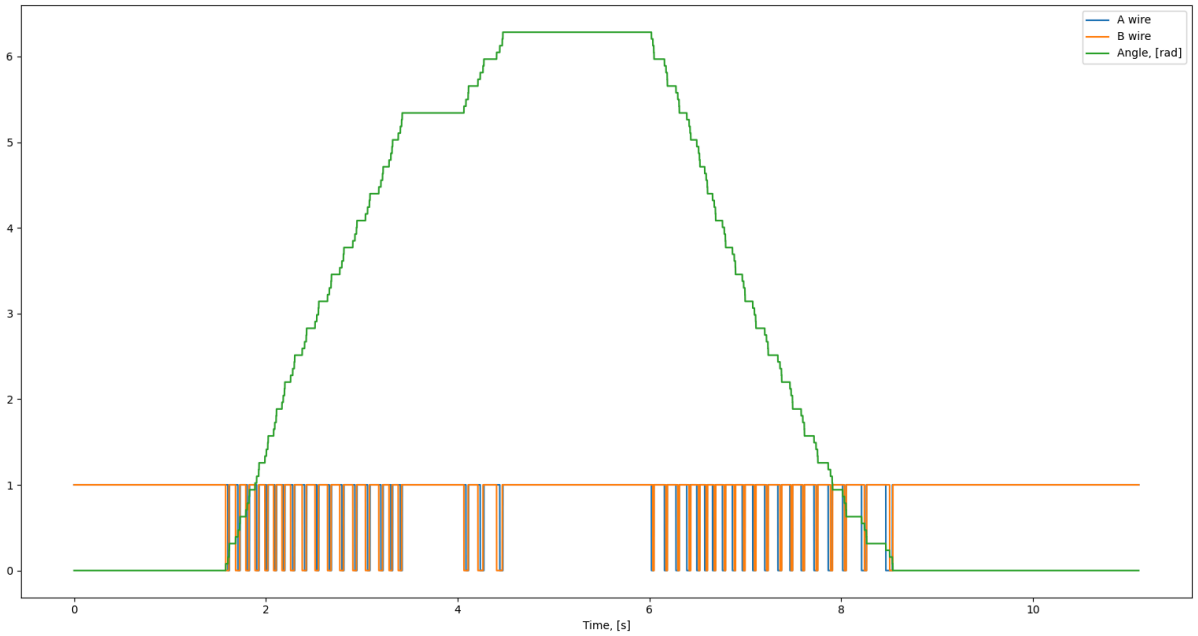
Purpose: Get data about revolute angle from incremental encoder using STM32.
Sensor application: The KY-040 rotary encoder is a rotary input device that provides an indication of how much the knob has been rotated AND what direction it is rotating in. It's a great device for stepper and servo motor control. You could also use it to control devices like digital potentiometers.
List of used equipment: KY-040 rotary encoder, STM32

Experiments:

1. Check your encoder quadrature algorithm. To do this, run the algorithm and then make the encoder move first in one direction and then in the other. Describe your actions and attach a graph of encoder measurements versus time. What do you observe on this graph? Is your algorithm correct?
2. How does the relationship between encoder readings and time change with different voltages and why? UPD: The question does not imply the relationship between the voltage on the encoder and the reading, but the relationship between the encoder reading and the voltage on the motor.
3. How does the resolution of an encoder affect the precision of a system?

Results of experiments:

1. As shown on the picture, angle increase to 6.283 (2 pi) and we may count that A an B channels change 20 times to increase (clockwise rotation) and 20 times to decrease (counterclockwise rotation). The expected results also show the correctness of the algorithm.



2. We don’t use motors in this lab, but the answer to the question is simple - the higher the voltage on the motor, the higher its rotation speed and the faster the angle on the encoder increases.
3. Resolution of an encoder affects the precision of a system by determining the smallest distance that can be measured. Higher resolution allows for more precise movements and control, which is essential for tasks requiring high levels of accuracy.

Github link:
https://github.com/Anryan2/Sensors_and_sensing_lab