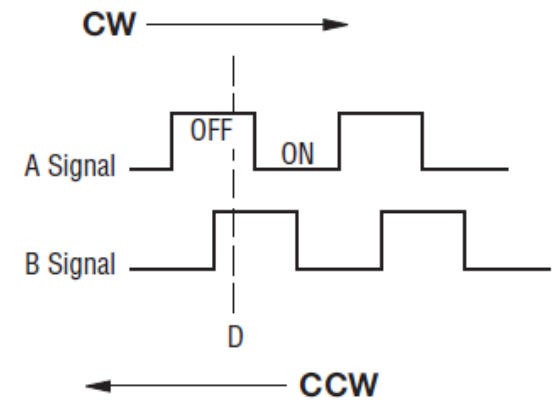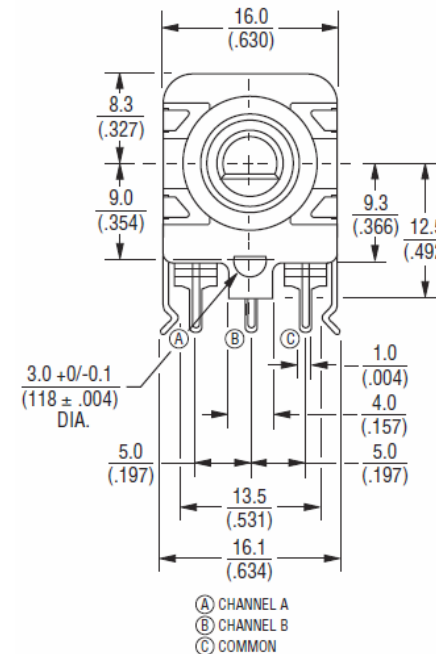# Rotational Angle Measurement using Encoder

Week 04
2023-03-23
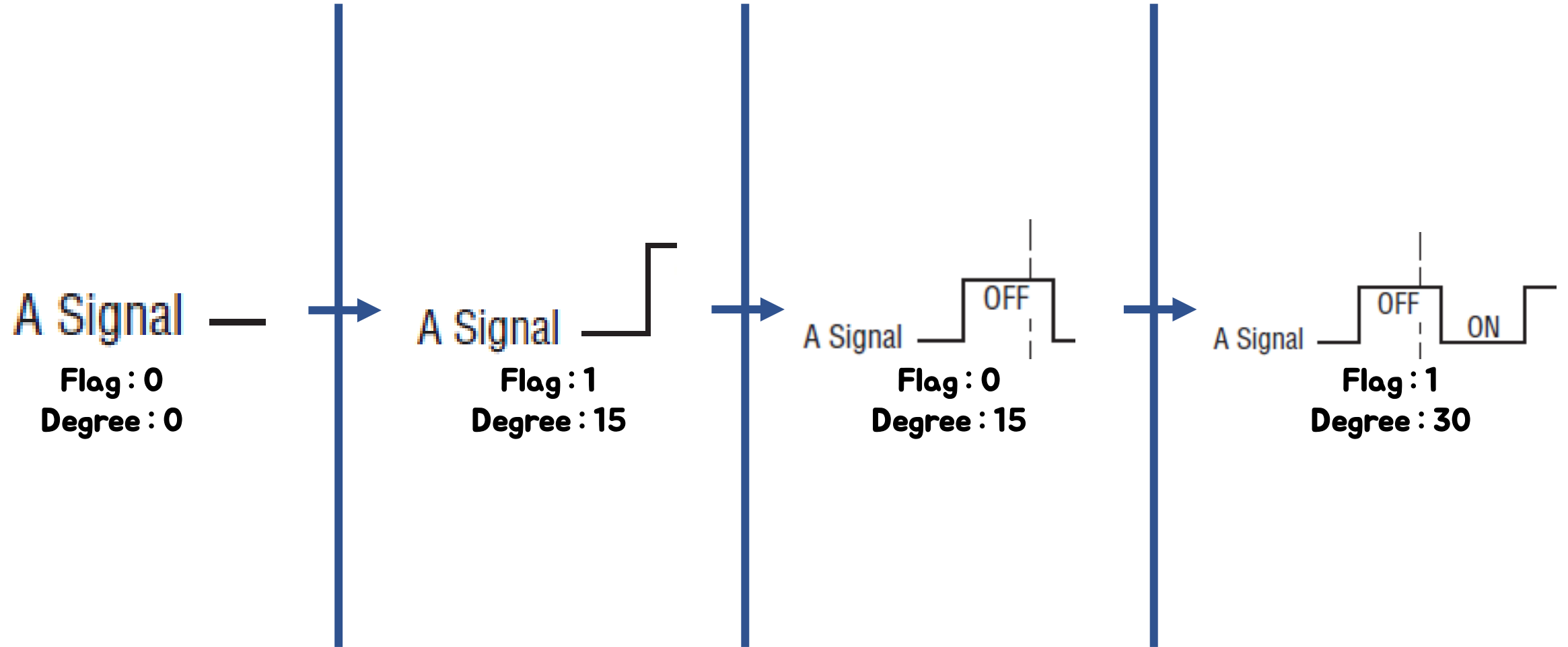
Handong Global University

Smart Sensors and IoT Devices

1. Rotational angle in CW using A signal

1) Make a **circuit** to measure A signal from channel A of the encoder
- Channel A with 5V, Resistor, Ai0
- Channel B with No use
- Channel C with Ground

2) Write a **MATLAB code** that **reads the voltage** of A signal and **find resolution** (pulse per rotation, PPR)
- Sample rate: 100[Hz], Duration time: 10[sec]

3) Modify your code to **display the current rotational angle** in clockwise

   A. **Read rising edge** of A signal

   B. Range: 0 ~ 360[deg]

1. Rotational angle in CW using A signal

A Signal

Flag : 0
Degree : 0

A Signal

Flag : 1
Degree : 15

A Signal ___ OFF

Flag : 0
Degree : 15

A Signal ___ OFF ___ ON

Flag : 1
Degree : 30

2. Angular position & direction – A, B signals

1) Make a **circuit** to measure **A and B signals** from the encoder
2) Write a **MATLAB code** that reads the voltage of A and B signals
   A. Sample rate: 100[Hz], Duration time: 10[sec]
3) Modify your code to **display the current rotational angle**
   A. Read rising edges of **A signal for angular position**
   B. Refer to the state of **B signal for rotational direction**
   C. Range: 0 ~ 360[deg], Sign: CCW(+), CW(−)
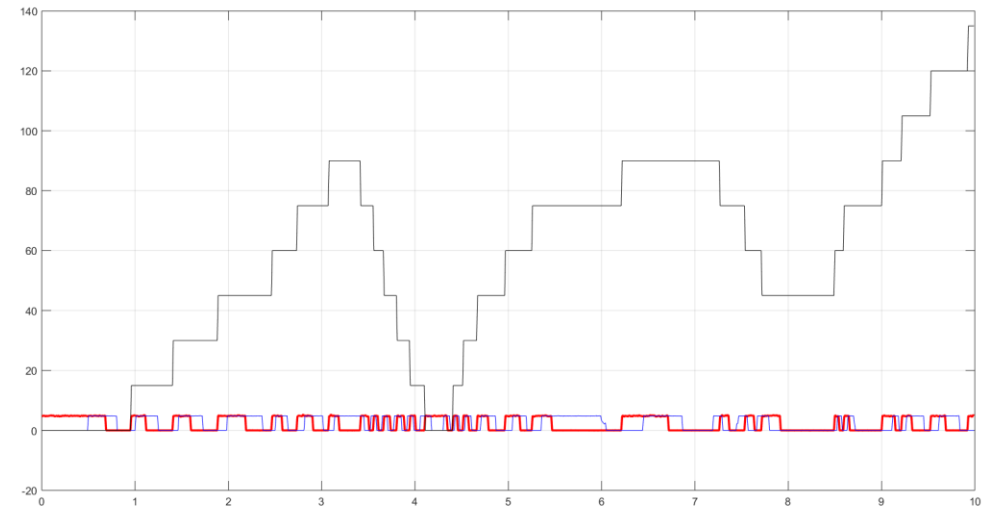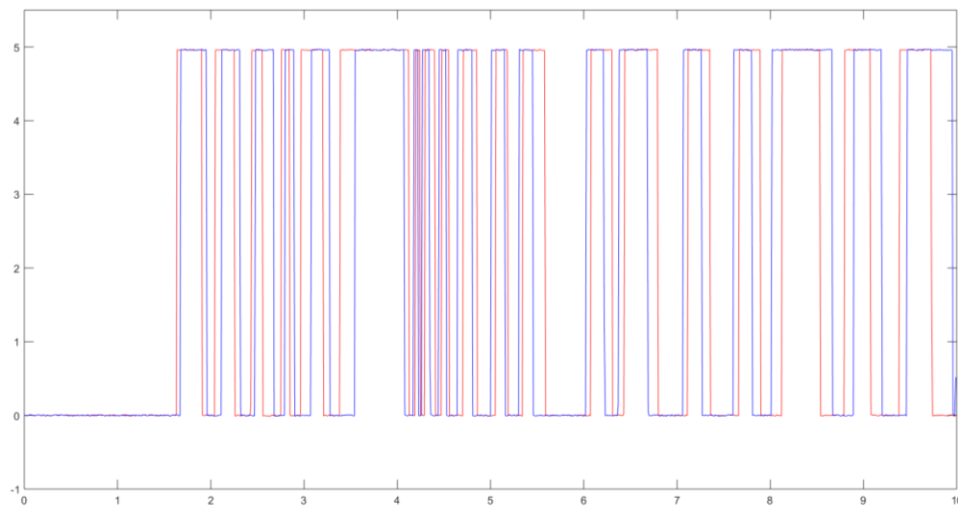
2. Angular position & direction – A, B signals

4) **Double the resolution** by utilizing rising and falling edges of A signal

5) **Quadruple the resolution** by utilizing rising and falling edges of both A and B signals

6) Is higher resolution always a better choice? Why or why not? **Discuss** in terms of actuator's rotational speed and sampling frequency
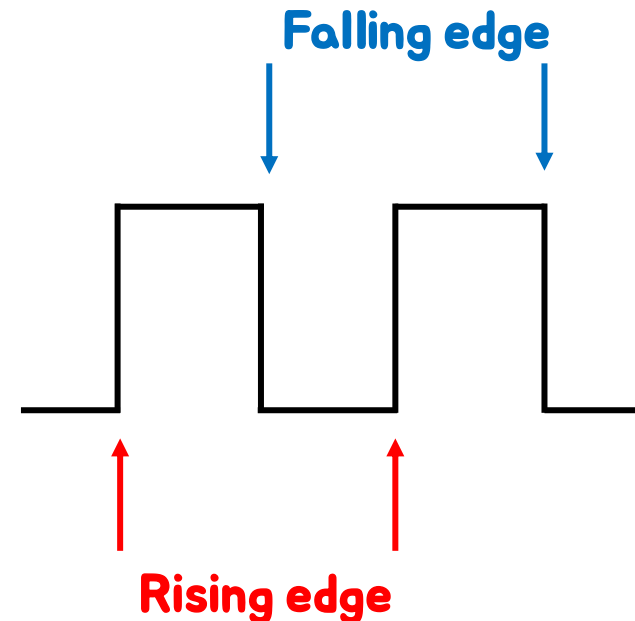
2. Angular position & direction - A, B signals

Is higher resolution always a better choice? Why or why not?

Discuss in terms of actuator's rotational speed and sampling frequency