Lab7
IMU

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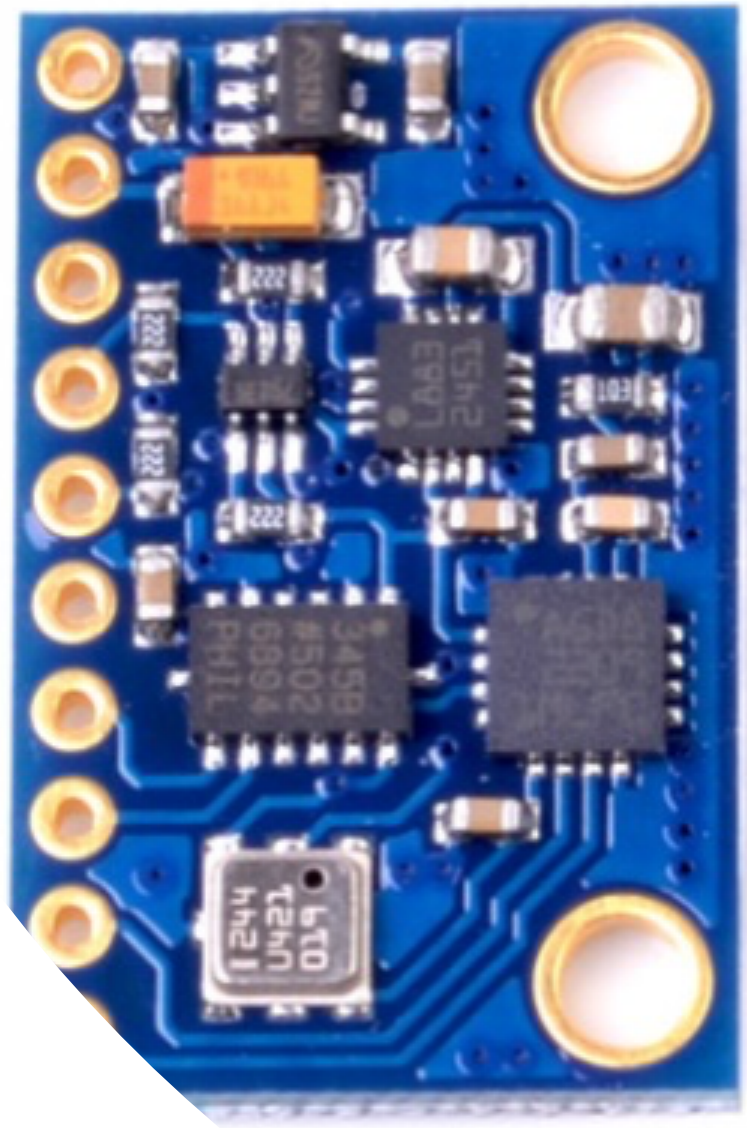
About this lab

- To study the improvement of data stability by using Complement and Kalman filters.
- Easy lab, not coding, just to analyze the data and understand the concept.

IMU: Inertial Measurement

- Seems simple, but very practical and promising. Drones, unmanned driving…
- **3-axis accelerometer ADXL345**
- **3-axis gyro L3G4200D**
- 3-axis compass HMC5883L
- 3-axis barometer BMP180

- To measure the angular.
- atan2 func



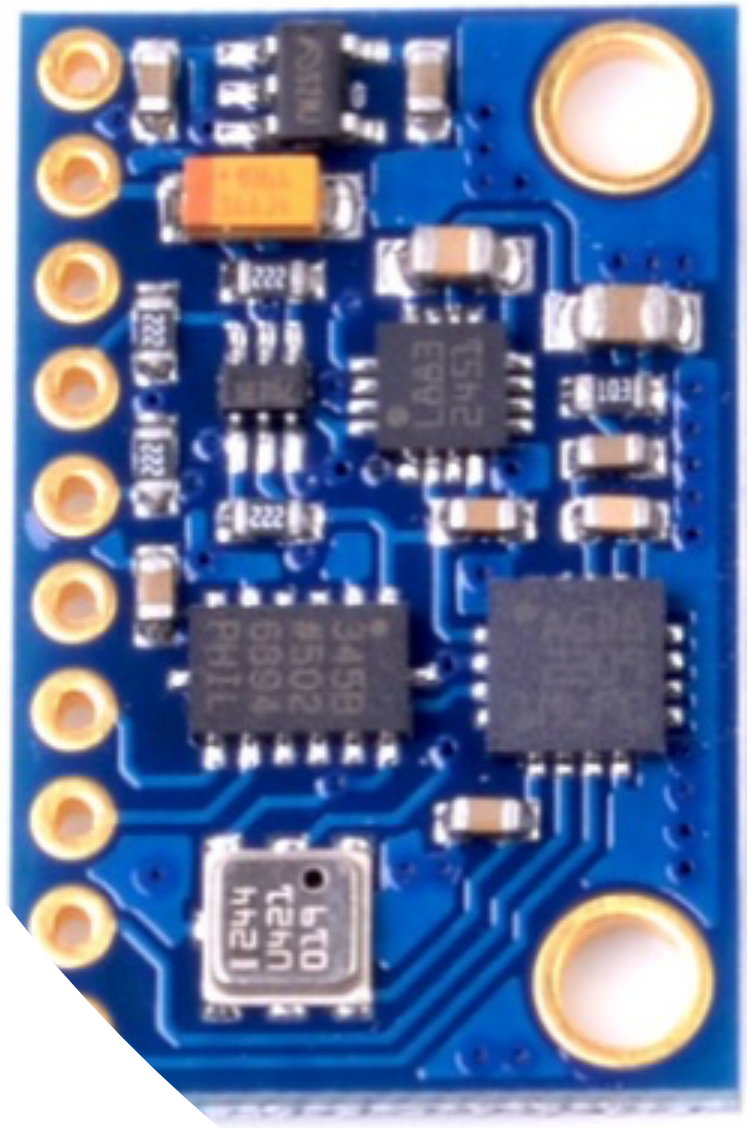
Why filters?

The problem with accelerometers:

Sensitive to environment, so containing ma high-frequency signal

The problem with gyroscopes:

integration over time, the measurement has the tendency to drift.



Why filters?

Solution #1:
Complementary filter

$$angle = 0.98 * (angle + gyrData * dt) + 0.02 * (accData)$$

Gyro

Accelerometer

Why filters?

Solution #2:
Kalman filter

```
kang = kalmanCalculate(Angy, GyroIN[0],interval);
```

We implement both Complementary filter and Kalman filter in this lab.

Notice

- Show us graphic like this one.
- And submit the report before next weekend.