551: The Principles of Signals and Wireless Communication for Embedded Systems

Term Project - **Due:** 20 January 2019

Lecturer: Kasım Sinan Yıldırım

Object Tracking

You are going to implement **your own** object tracking system using Kalman filter.

Steps:

You are going to employ the following steps:

- Simulate (or you can use real-data) an object movement in 2D plane.
- Use Kalman filter to estimate the position if the object based on its current position estimate and measurements.
- Show (plot) the estimated and real trajectory of the object.
- You can check these videos for inspiration:
  `https://www.youtube.com/watch?v=GBYW1j9lC1I`
  `https://www.youtube.com/watch?v=Jq8HcIar68Y`

Deliverables

Your **original** (*not copy and paste*!) source code (MATLAB, or any other language)

A **report** explaining the following items:

- What is a Kalman filter? How does it work in general? Give some application examples.
- How did you formulate object tracking problem and how did you employ Kalman filter?
- Demonstrate how Kalman filter worked in your code.

You should also include a short research on *particle filters:*

- What is a particle filter? How does it work?
- How would you solve object tracking using particle filters?
- What is the difference between particle filter and Kalman filter?

Use **Latex** to write your report; (e.g. check the templates `https://www.latextemplates.com/`, `https://tr.sharelatex.com/`), and send the zipped latex source file of your report.