Assignment 4

All assignment submissions are to be made on LEARN Quiz by 11:59 PM on the assigned due date. No extensions will be given, and assignments will not be accepted after the due date.

Problem Statement: Three estimtors Estimator 1, Estimator 2, Estimator 3, have been built to estimate the location of a mobile robot based on different sensors. The goal here is to fuse these estimators using OWA and MEOWA.

A matrix of spatial performance of each estimator is provided: Est{i}_RMS_errors (a 20 x 20 matrix) where the values indicate the RMS error in localization obtained from a different robot with similar sensors and estimators, where *ij* element indicates the position of robot with respect to x (columns of the matrix) and y (rows of the matrix) of an inertial coordinate system. Row 2 column 5: means that robot is at (2m,5m) position.

For instance for estimator 1 we can have the RMS distribution below. You can plot the other in MATLAB.

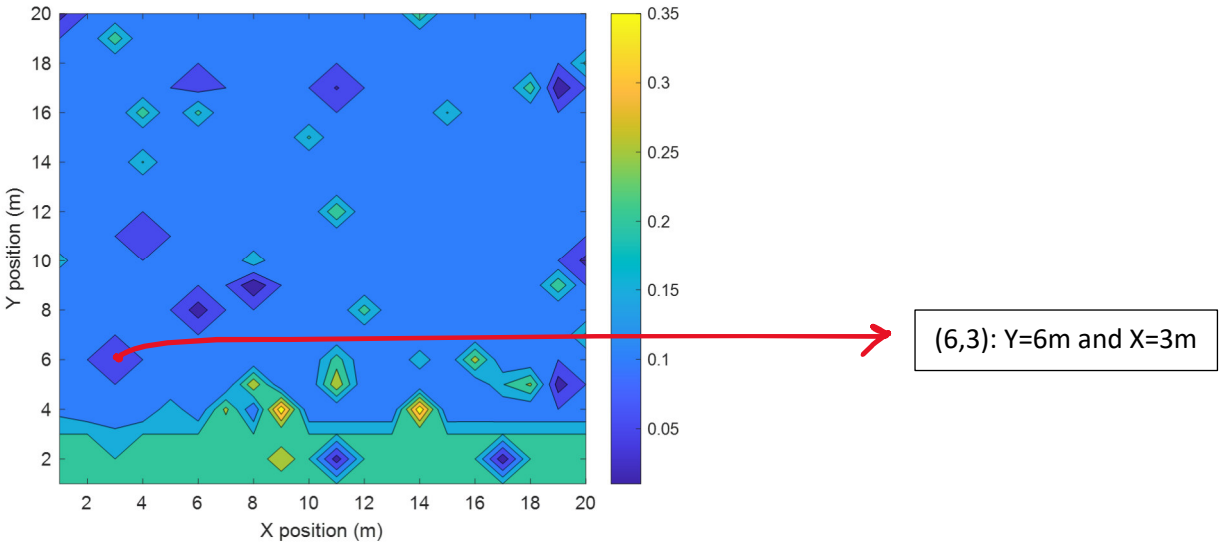

Figure 1. A typical RMS error mesh on the estimated robot location (expected performance of the Estimator 1)

1) The three estimators have these estimations of (y,x) of robot position:
   Estimator 1: (4.3, 3.2)
   Estimator 2: (4, 3.1)
   Estimator 3: (6, 3.3)
   Let's assume that the weights of OWA operator (for problem 1 and 2) was fixed from before as
   [0.55 0.30 0.15].

What is the result of OWA fused estimation of y and x?
Assume each sensor estimation separately to estimate its goodness of results (use the closest grid RMS).

2) Now if with the obtained fused estimation re-evaluate the order of estimators (use the grid closest to the fused estimation to re-evaluate the order).
3) If we want to use new weights to have an **Orness of 0.725**, which set of weights provide us that (check the quiz).
4) Find the **max entropy weights** for the three estimators fusion with MEOWA given the **Orness level of 0.725**.