Algorithms for Intelligent Robots

Tutorial 5: Robot localization with the extended Kalman filter

A differential driving robot with inputs of v_r and v_l for right and left wheel velocity. If the driving signal noise is assumed to be of zero mean and a variance of σ^2 for both velocities. It is also assumed that a range sensor is used to measure the distance between the robot location (x_r, y_r) and three landmarks (x_1, y_1), (x_2, y_2), and (x_3, y_3). The measurement device has a gaussian noise of zero mean and variance of σ_m^2. Using Kalman filter to estimate the location of the robot. Assuming that the initial pose of the robot is [0 0 0] and a state covariance matrix $P=\mathbf{0}_{3x3}$.

Note: Use MATLAB to implement the filter.