We will now add measurements to our Kalman filter. Suppose at time $t$, we can receive a noisy observation of $x$. In expectation, our sensor measures the true location. However, this measurement is corrupted by Gaussian noise with covariance $\sigma^2 = 10$.

(a) Define the measurement model. Hint: You need to define a matrix $C$ and another matrix $Q$ (c.f., Equation (3.6) and Table 3.1).

(b) Implement the measurement update. Suppose at time $t = 5$, we observe a measurement $z = 5$. State the parameters of the Gaussian estimate before and after incorporating the measurement (see above for instructions as how to plot an uncertainty ellipse).

**Hand-In**

This assignment doesn’t have to be handin, it will be discussed in class.